

research MATTERS

MEMORIAL UNIVERSITY'S RESEARCH MAGAZINE FALL 2015

MAKING THE CONNECTION

Innovative collaborations with
researchers, industry and students

GRADUATE STUDENTS HODA RAJABI, CINDY PENNEY
AND JUSTIN PATER ARE RESEARCHING HEREDITARY
MEDICAL CONDITIONS – page 28





Letter from the vice-president *(research)*

In the world we live in, collaboration and teamwork are often at the heart of exceptional research. When I think of the research stories that resonate best with me, they include not only faculty members, but students, post-doctoral fellows, technicians and others working tirelessly together to solve some great problem, or create some groundbreaking work of art. Often, they embark on a journey, uncertain of what their efforts will amount to. In the end, a blend of patience, tenacity, creativity – and even courage! – yields results, some of which can be transformational.

The stories you'll find in this issue of Research Matters encapsulate a celebration of the collaborative research undertaken at our university. It acknowledges that research, although sometimes risky, can be a journey of learning, growth and professional maturation for our students, while representing a deeply meaningful adventure for our faculty members. It can also lead to exciting new opportunities in surprising directions. But ultimately, it requires the support and shared vision of many to help realize its potential for both knowledge creation and artistic creation, and contribute to the evolution of industry, the economy, or society as a whole.

Memorial University is committed to helping its students and faculty members achieve their potential. The university has ambitious plans for growth, as outlined in the Strategic Research Intensity Plan 2014-2020. By the end of 2020, we plan to strengthen "all aspects of research at Memorial University, including scholarship and creative activities, as well as the translation of knowledge into products, practices and policies and other forms of community engagement." You can find out more about the Plan and how far we've come on page two.

I invite you, reader, to embark on this journey with Memorial's researchers, and to discover along with them. I have no doubt that the stories ahead will excite and inspire you about the future of research at Memorial.

Sincerely,

Richard Marceau, PhD, P.Eng., FCAE
Vice-President (Research)

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Editor

Krista Davidson

Graphic design

Shane Mills

Contributing writers

Kelly Foss
Moira Baird
Jackey Locke
Susan White
Lisa Pendergast
Sandy Woolfrey-Fahey
Virginia Middleton

Janet Harron
Laura Woodford
Leslie Earle
Kim Thornhill
Heidi Wicks
Marcia Porter
Alli Johnston

With special thanks

Dr. Richard Marceau
Dr. Ray Gosine
Dr. Carrie Dyck
Meaghan Whelan
Chris Hammond
Patrick Tyler
John Harvey
Tina Winsor

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INTENSIFYING RESEARCH

One year after the launch of the Strategic Research Intensity Plan

BY KRISTA DAVIDSON

#WEARERESEARCH

THE STRATEGIC RESEARCH INTENSITY PLAN (SRIP), launched in May 2014, builds on Memorial University's vision to "...be one of the most distinguished public universities in Canada and beyond..."

The plan reflects a synergistic and integrated approach for strengthening all aspects of research at Memorial University, including scholarship and creative activities, as well as the translation of knowledge into products,

practices and policies, and other forms of community engagement. Goals leading up to the end of 2020 include enhancing Memorial's research reputation, graduating highly qualified personnel and addressing the research priorities of Newfoundland and Labrador.

In the past year, the implementation of so many of the plan's actions has created a "buzz"! Here are some of the milestones achieved in the first year (2014/15).

Fogo Island Research Fellowship Program: In partnership with the Shorefast Foundation, Memorial University will select up to ten faculty members per year to spend four weeks in residence on Fogo Island. The program enables faculty members to complete the writing of a significant manuscript which disseminates the results of a major research project, or to complete work on a major work of artistic creation. The first competition closed in May 2015 and the ten fellowships will be taken up during the 2015-16 academic year.

Core Research Equipment and Instrument Training (CREAIT) Network has undergone a number of changes to give it a stronger financial foundation and provide top-notch services to researchers and external stakeholders. The pan-university network has significantly reinvigorated its governance structure, re-engaged faculty members and implemented measures to increase transparency, accessibility and improved collegial decision-making. Examples of such measures include quarterly meetings with the Scientific Advisory Committees (SAC) to facilitate ongoing improvements, the online publication of a revised rate structure and improved business planning of operations to enhance customer service.

The Seed, Bridge and Multidisciplinary Fund: The fund seeds new, “early days” innovative research projects and provides valuable bridge funding for researchers who are between grants; it also encourages the development of multidisciplinary research activities. In 2015, there have been two competition rounds (January and May). The first competition attracted 48 applications, of which 31 received funding. The second round attracted 50 applications, of which 28 were awarded funding.

The University Student Summer Internship Program: Memorial’s undergraduates were invited to apply for the first University Student Summer Internship Program (USSIP). USSIP, made available through the Office of the Vice-President (Research), provides students with the opportunity to carry out a 13- or 16-week research work term under the supervision of a full-time faculty member or regular term appointee. The first competition opened in February 2015 and received considerable interest: 45 applications were received and 15 awards were given to support research-based summer internships for students in the areas of medicine, pharmacy, arts and science.

Research MUCEPs: Since January 2015, the Office of the Vice-President (Research) has supported an additional 56 student-research positions through the Memorial Undergraduate Career Experience Program

(MUCEP). The program, which is offered through Career Development and Experiential Learning (CDEL), provides students with career experience while they pursue their studies. The program supports greater opportunities for undergraduate training and engagement and will stimulate a heightened interest among undergrads in graduate studies and research careers.

Research Grant and Contract Services (RGCS) now integrate pre- and post-award administration in a “one-stop shop” approach. Since the implementation of SRIP, RGCS have put in place a number of changes to streamline processes and better facilitate grants and awards services with an emphasis on quality customer service. Significant improvements have been made in the processing times for contracts and disbursements. Service improvements are ongoing and more changes will be implemented as RGCS moves toward more IT-based processes.

The Researcher Portal is a web-based research application under development by RGCS and the Office of the Vice-President (Research) to improve accessibility of services and facilitation of awards for researchers. The Researcher Portal will manage and report on all of Memorial’s research awards and ethics certifications activities. The portal will be rolled out in two phases: researchers can expect to see the ethics certification application in the fall of 2015 and the research awards module in the winter of 2016.

Memorial University’s Innovation Strategy: Last but not least, the Office of the Vice-President (Research) released Memorial’s new Innovation Strategy for university-wide feedback on June 10, 2015. The strategy is intended to guide Memorial in creating what it hopes to be one of the most progressive innovation environments in Canada. In crafting the strategy, consultations were held with more than 100 industry associations, government agencies and industrial partners, revealing a desire for Memorial to increase its contributions toward advancing the economy of the province of Newfoundland and Labrador. The strategy, currently in draft form, aims to: foster a culture of innovation; revise and implement its policies in support of innovation; establish responsive business structures and processes; and, ensure adequate oversight and guidance of its innovation structures and processes. The draft Innovation Strategy can be downloaded for comment at: http://www.mun.ca/research/about/Memorials_Innovation_Strategy.pdf

Visit www.mun.ca/research to learn more.

FROM BENCH TO RESEARCH

How collaboration can help provide stroke patients with the right support

BY KRISTA DAVIDSON

L-R: Megan Kirkland, Jason Stevens, Dr. Jeannette Byrne, Dr. Michelle Ploughman, Dennis Cramm, Jennifer Shears

LEARNING TO STAND AND WALK are just some of the basic milestones we take for granted, but imagine for a moment the incredible challenge this poses for patients recovering from a stroke, who also suffer from paralysis on one side of their body.

Jennifer Shears is a physiotherapist studying Neuroscience with Memorial University's Faculty of Medicine. Her master's research involves comparing two methods of sit-to-stand treatment to achieve symmetry of movement during the rehabilitative phase of stroke. This research aims to understand and examine the most effective treatment for post-stroke recovery in patients learning to stand and walk.

Ms. Shears is supervised by Dr. Michelle Ploughman, Faculty of Medicine in the Recovery and Performance Lab (RaP) located at the L.A. Miller Centre, and Dr. Jeannette Byrne, an associate professor in the School of Human Kinetics and Recreation. Dr. Byrne specializes in the biomechanics of human movement. Her specific research interests are in prevention of falls in seniors and offshore workers, in addition to trying to better understand how joint pathology impacts human ability to safely navigate in the environment.

Stroke patients learning to stand from the sitting position need specialized support during the recovery process. In order to carry out her research, Ms. Shears needed a custom-built bench with several precise adjusting mechanisms and a removable back. The bench needed to fit people of various heights, and be robust and sturdy enough to accommodate up to 500 pounds, all while fitting within the size and weight boundaries of the Zeno Protokinetics Walkway system—a special pressure sensing mat that collects data such as velocity, cadence, pressure and symmetry from the patients as they stand and walk.

That's where the Mechanical Division of Technical Services came into play. The Mechanical Division supports many research projects, providing services in design, fabrication, calibration and maintenance of research and testing equipment. Dennis Cramm, mechanical division manager, and Jason Stevens, project engineer, spent three months collaborating with Ms. Shears and her team to design a 3D model of a custom bench that would provide stroke patients with just the right support. Once the design was complete, the job of construction was

given to the talented machinists and welders of Technical Services.

"We were involved right from the start. There were some challenges, such as the lifting mechanism's travel constraints, the small allowable footprint of the base, and the need to cover up the lifting mechanism. As an added level of difficulty, there were no pressure points allowed on the feet of the base as it would interfere with the pressure mat. We used a combination of Selective Laser Sintering (SLS) to 3D-print the feet, machining to produce various parts of the lifting mechanism, a custom built bellows skirt, and welding fabrication to complete the project," said Mr. Cramm.


Ms. Shears' innovative research is comparing the two philosophies of promoting complete recovery versus learning to compensate. The bench will be used to investigate the effectiveness of promoting recovery over compensation strategies in patients during clinical trials, which are the next stage of Ms. Shears' research. The project is supported with \$5,000 in funding from the Newfoundland & Labrador Centre for Applied Health Research (NLCAHR).

"Compensation means that as a stroke patient, you now learn to become more efficient on your stronger side, but there's a cost to that because you stop using your affected side," said Dr. Michelle Ploughman, a Tier 2 Canada Research Chair in Rehabilitation, Neuroplasticity and Brain Recovery.

In addition to studying neuroscience, Ms. Shears works as a physiotherapist with the Rehabilitation Continuing Care Program with Eastern Health. She says that her interest in this research venture stems from her multidisciplinary background and desire to help people.

"What's led to this research is 21 years of being a physiotherapist," said Ms. Shears. "I want to make people better and make them more efficient in their world. We don't have patients for very long so we need to optimize what we do to maximize their recovery with the time we have by not giving them tools to compensate."

FUNDING: Newfoundland & Labrador Centre for Applied Health Research



CREATING A CO₂ ENERGY BOOST

Terra Nova Young Innovator seeking inventive solutions for carbon dioxide

BY KELLY FOSS

Dr. Chris Kozak (pictured) will look at inventive uses for carbon dioxide.

PHOTO CREDIT: CHRIS HAMMOND

CARBON DIOXIDE (CO₂) is a naturally occurring chemical compound that exists in the Earth's atmosphere.

Its presence comes primarily from three sources – as a by-product of respiration and the natural decomposition of some organic materials and as a product of burning materials with carbon in them.

With such a cheap and abundant supply of CO₂, researchers at Memorial University have been trying to determine whether or not it can be used as a resource to make other, more valuable, materials.

"Chemists have been playing around with CO₂ for a while," said Dr. Chris Kozak, an associate professor with the Department of Chemistry. "The problem is, it's a very un-reactive molecule. So you're taking a very low energy molecule and basically trying to go uphill with it, in terms of energy, to make something else. To do that we need catalysts; we need other molecules that will make that process more viable and won't cost us a lot of energy."

One of the products his team has been looking at making with CO₂ is polycarbonate plastic. Polycarbonates are glass-like, but can also be very flexible. Currently, polycarbonates on the market are made with Bisphenol A (BPA). This compound can mimic estrogen and questions about safe exposure levels have increased in recent years, leading to renewed calls for plastics made from other materials.

"What we've found is that by varying the conditions, (either temperature, pressure of CO₂ or how much catalyst you add), you can dial in selectively what kind of product you get, whether it's something that's oil-like, liquid or crystalline," said Dr. Kozak. "If we can develop polymers that are flexible, they may be able to replace the polycarbonates currently in use."

Practical and commercial uses for such a compound are not unheard of. A researcher at Cornell University has recently used this idea to create and commercialize a CO₂-based biodegradable cling wrap film.

"It's great because if you use a paper-based tray, you can put your sandwich on it and cover it with this polycarbonate plastic film," explained Dr. Kozak. "When you're done, you can put the tray and plastic in your compost heap and it decomposes back to CO₂ and water. It's just a beautiful application."

Dr. Kozak and his team are looking at other ideas,

including using CO₂ as a solvent. Working with Dr. Fran Kerton, a fellow Department of Chemistry associate professor, they've been taking CO₂ and applying pressure and heat to turn it into supercritical CO₂, a liquefied CO₂ state which can dissolve greases and fats easily.

But it won't help get rid of CO₂ in the atmosphere. We're using so little of it, if we were to convert all of the CO₂ that's generated by burning fuels, we would have to make more plastic than the planet currently consumes.

"This is just one way of using an abundant feedstock that isn't going to use up our precious petrochemical supplies. Because people forget that we don't just burn oil to heat our homes, we need oil to generate energy and to make thousands of products used every day. But mostly we just burn it, which is terribly wasteful."

Dr. Kozak was named Memorial University's Terra Nova Young Innovator in 2011. The award, which recognizes new faculty researchers whose work has the potential to be of significance to society at large, came with a grant of \$50,000 (cost-shared between Memorial University and Suncor Energy Inc.) It gave Dr. Kozak the boost he needed to delve into the CO₂ research.

"The Terra Nova really allowed me to jump in with both feet and hire a couple of students," he said. "I've got about 10 papers, most dealing with CO₂ or biodegradable polymers in one way or another, all coming out in the next little while."

"If we can come up with something new, a new polymer to patent, they'd [commercial partners] be much more interested. But we're still in the proof-of-principle exploratory stage right now."

Dr. Kozak has also received equipment funding from the Canada Foundation for Innovation and the Research & Development Corporation. He hopes to get additional funding in the future to hire postdoctoral fellows and more graduate students. He also emphasized the role undergraduate students play in research at Memorial.

"Our undergrads are just amazing," he said. "They come in and they're hungry and motivated. A number of my papers have been spearheaded by undergrads, with a graduate student driving the bus, for the most part."

FUNDING: [Suncor Energy Inc.](#)
[Memorial University](#)
[Canada Foundation for Innovation \(CFI\)](#)
[Research & Development Corporation \(RDC\)](#)



GIVING A VOICE TO THE DEAF

Collaborative research to help the Deaf community communicate pain

BY MARCIA PORTER

L-R: Dr. Victor Maddalena, Ms. Sheila Keats, Dr. Sandy LeFort and Mr. Myles Murphy

PHOTO CREDIT: CHRIS HAMMOND

DR. SANDY LEFORT'S RESEARCH FOCUS on chronic pain began over 25 years ago, after a close family member with terminal cancer and suffering terrible pain, was admitted to the Palliative Care Unit (PCU) at St. Clare's Mercy Hospital in St. John's.

"The PCU was about comfort and quality of life. The approach to pain management was different than what he (our family member) had experienced in acute care, so I became very interested in pain as an area of research and decided to focus on painful chronic conditions," said Dr. LeFort, a retired but active faculty member and researcher at Memorial's School of Nursing.

A pioneering voice in the field for more than two decades, Dr. LeFort has presented at international conferences on chronic pain and created the gold standard in patient education programs. Her Chronic Pain Self-Management Program (CPSMP) was adopted by institutions such as Stanford University. Dr. LeFort's most recent book is *Living a Healthy Life with Chronic Pain*.

But just a few months ago, Dr. LeFort was asked to collaborate on an area of pain research completely new to her: pain communication in the Deaf community.

Dr. Victor Maddalena of the Faculty of Medicine's Division of Community Health and Humanities, and Myles Murphy, executive director of the Newfoundland and Labrador Association of the Deaf (NLAD) had been studying palliative care in the Deaf community, and pain assessment was identified as a key issue.

They asked if she would lend her expertise to the team and she was more than willing.

One of the questions posed included, 'How do you assess pain in people who are deaf, and use sign language to communicate?' To date, there's very little research available to answer this question. A literature review turned up only one relevant article about a research project on pain assessment in the Deaf, conducted by a group of Italian nurses.

Drs. LeFort and Maddalena's research was funded through a five-year \$1.87 million pan-Canadian national initiative, supported by the Community Alliances for Health Research and Knowledge Exchange in Pain (CAHR).

Working with Mr. Murphy, who has served as a voice and advocate for the Deaf community for many years, the researchers set up focus groups among the NLAD membership.

"I had never considered the obstacles that the Deaf, Deaf interpreters and American Sign Language (ASL) interpreters face in terms of trying to communicate about pain," said Dr. LeFort.

"Hearing people rely on voice, intonation...the doctor can hear the anger and frustration," said Mr. Murphy, speaking through American Sign Language (ASL) interpreter Sheila Keats, who's been an important part of the research team.

"The hardest question to respond to is: 'How bad is your pain? Describe your pain?' A deaf person can't hear so they have to use their eyes; the visual cues are the ones you are trying to pick up."

Research findings confirmed the importance of both ASL and Deaf interpreters at health care visits, and identified potential pain assessment tools such as visual analogue scales that have 1-10 rankings that are easy to read and understand.

It's the beginning of an important area of research, said Dr. LeFort, and a wonderful partnership with the Deaf community.

When Dr. LeFort presented the team's research at conferences for the American Academy of Pain Medicine and the Canadian Pain Society annual meeting, there was a high level of interest.

"People commented they had not been aware of the issues around pain communication for the Deaf," she said. "We also received a number of emails from health care professionals who are themselves deaf and commented of the importance of this work."

The research team is planning a second phase of the project to delve further into their findings, and develop tools that will be useful for the Deaf community and for health care practitioners to communicate pain.

FUNDING: *Community Alliances for Health Research and Knowledge Exchange in Pain*

MENTIONED IN SONG

Occupational songs of the logging industry

BY LISA PENDERGAST



WORKING WITH A PASSIONATE TEAM, Dr. Ursula Kelly, a professor with the Faculty of Education, combined her research interest in cultural studies and critical literacies of place and identity with her experiences as a logger's daughter to create *Mentioned in Song*.

Mentioned in Song: Song Traditions of the Loggers of Newfoundland and Labrador is a project that researched occupational songs of the logging industry in Newfoundland and Labrador; making available to the public a piece of our history and culture that was previously unrecorded.

"At camp, loggers wrote, sang and shared songs and stories, and brought them back to their communities so that their families and friends could learn about logging," said Dr. Kelly. "Their songs are grassroots scripts of social history."

Dr. Kelly's interests led her to Memorial's Research Centre for Music, Media and Place (MMaP) where she met Drs. Beverley Diamond and Meghan Forsyth. Dr. Diamond (a Tier 1 Canada Research Chair in in Traditional Music/ Ethnomusicology, Winner of SSHRC's Gold Medal Award, and director of MMaP), is the series producer of *Back on Track*, a CD and booklet series that takes rare and inaccessible music and releases it to the public - exactly what Dr. Kelly wanted to do with the virtually-unknown logging songs. MMaP supported Dr. Kelly's project proposal and the Harris Centre provided funding.

"This project was a perfect fit for MMaP since we aim to put archival audio recordings back into circulation and to create richly-illustrated social histories of song and spoken word," said Dr. Diamond. "The way in which



L-R: Dr. Ursula Kelly, Dr. Beverley Diamond, Dr. Meghan Forsyth

Ursula proposed to weave together this story of logging and song was irresistible."

Dr. Meghan Forsyth is a project coordinator and researcher at MMaP; her role was to contact collectors, singers and composers, or their kin, to confirm copyright of the songs and to gather additional information. The project came to life with the help of Mr. Spencer Crewe, digital audio studio coordinator, and publication designer, Mr. Graham Blair. The result is a CD of 27 songs, both restored and new arrangements, and a booklet that tells the story of the logging history in Newfoundland and Labrador.

The team feels that their different backgrounds all contributed to this project. "We would listen independently to the songs, rank them, and then compare notes," said Dr. Forsyth. "Ursula listened differently to the songs than Bev and I, for example, selecting a song for its social significance over its musical characteristics. The collaborative process helped me listen differently than I might have on my own."

Mentioned in Song was launched on Jan. 16 at the MMaP Gallery in St. John's; a second launch was held in Norris Point on May 21 as part of the Trails, Tales and Tunes Festival. The CD is available for \$20 at the MMaP Research Centre or at Fred's Records in downtown St. John's.

"The project is a highlight of my 35 years as an academic," said Dr. Kelly. "I will always be thankful for the expertise and collegiality that Bev and Meghan offered as we pursued this project together."

FUNDING: Harris Centre, Memorial University





PHONETICALLY SPEAKING

How the second iteration of linguistic analysis software is sparking an international conversation

BY JANET HARRON

The complete Phon team: (L-R) Gregory Hedlund, Rod Byrne (computer science), Todd Wareham (computer science), Yvan Rose (linguistics).

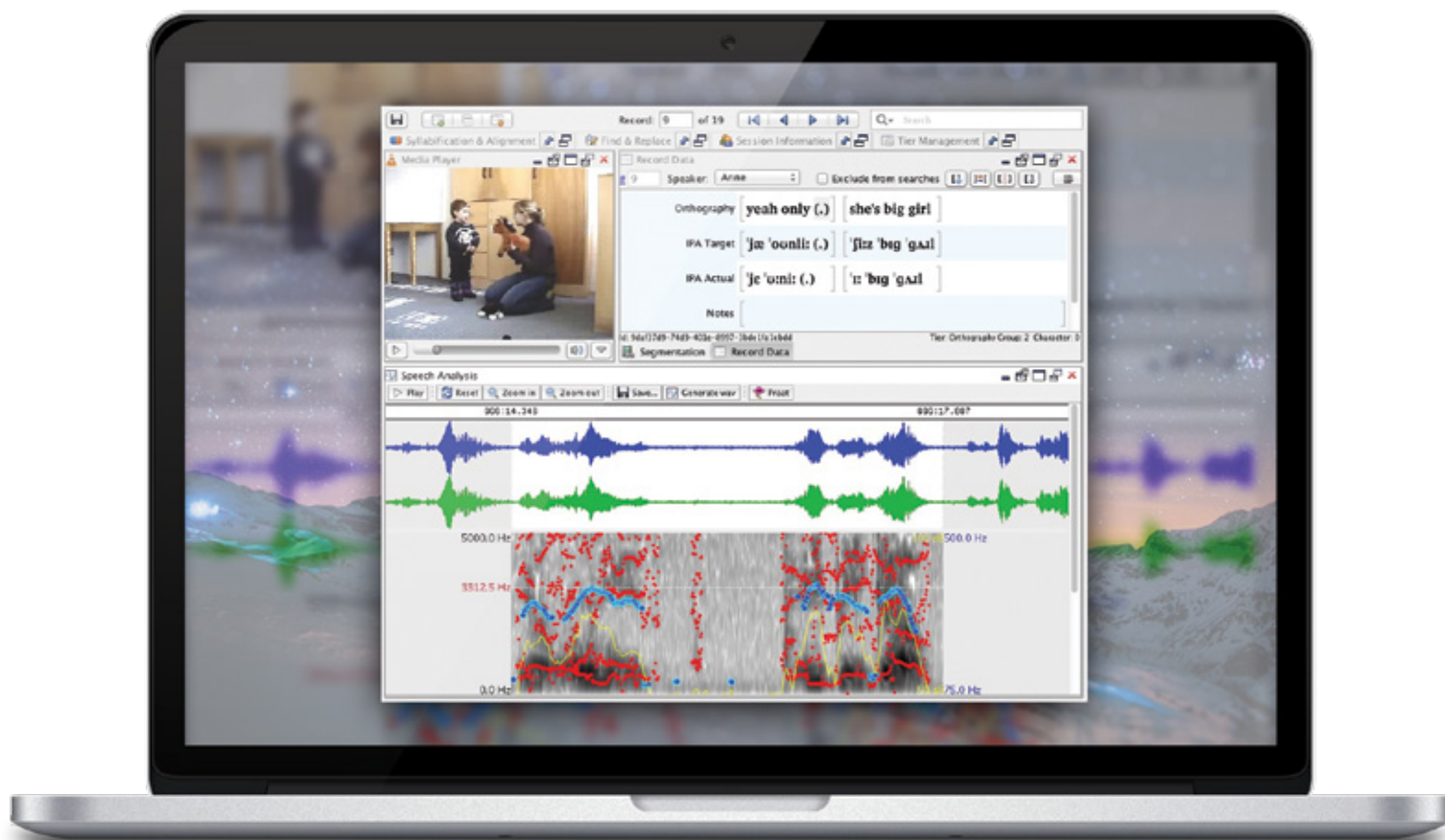
DR. YVAN ROSE'S LAB on the fourth floor of the science building hosts a room with a prominent poster of Einstein and a modest bank of computers. The lab also happens to be the headquarters for Phon, one of the world's most successful software systems for linguistic analysis and the result of a decade-long collaboration between Dr. Rose and computer programmer Gregory Hedlund.

A number of software tools in linguistics do specific tasks such as analysing texts or speech sounds. In contrast, Phon is a more general system that can perform a variety of functions for formatted linguistic data. Almost from its inception, Phon has played a key part in a global research consortium, CHILDES (the Child Language Data Exchange System), which is funded by the National Institutes of Health.

Dr. Rose and (then) computer science student Gregory Hedlund began working together in 2004. Dr. Rose wanted to provide a pair-wise analysis of aligned phones (sounds) for researchers studying phonetics and phonology. Mr. Hedlund developed the initial algorithm, which eventually became Phon. The first iteration of Phon was part of Mr. Hedlund's honours thesis, and he has worked full-time on Phon ever since.

Both the linguist and the computer scientist had to learn each other's technical jargon in order to communicate, eventually agreeing on a set of terms they would use so they could understand each other.

With absolutely no linguistics background, Mr. Hedlund, who does all the programming for Phon, now "talks and thinks like a linguist," according to Dr. Rose. "I deal



with Greg the way I would with a creative writer, not a programmer.”

Their partnership is only the tip of Phon’s collaborative iceberg.

Phon has become an open-source software program used extensively for analysing speech sounds, language acquisition data, and Aboriginal language data. Phon is now being used by 350 graduate students, post-docs, researchers, and speech language therapists from over 27 different countries.

Dr. Rose recently offered guidance to a graduate student in Md, U.S. who was interested in speech disorders but who was working with an old hard-to-use database. Dr. Rose suggested a new way to format the data for use in Phon, and the student was then able to use this powerful new data mining tool. When questions regarding methodical approaches came up, Dr. Rose consulted with Mr. Hedlund, who was able to suggest an approach compatible with the current Phon software.

The result was a happy graduate student and a finished

thesis with data compilation and analysis generated by Phon.

“That student then becomes an advocate,” explained Dr. Rose. “If she has a chance to promote us and the database, she will. That’s how we are building community around the world.”

The latest version of Phon incorporates Praat, a widely-used application developed originally by a team based in Amsterdam, which analyses the physical properties of speech sounds.

“You have to think of language as a diamond. When you look at it from different perspectives you get a different story each time,” explained Dr. Rose. “We developed a way to look at language. The people in the Netherlands developed another way to look at language. What we’ve done is to bring these two ways together to combine our observations within a unified framework (Phon) which is our invention.”

FUNDING: *National Institutes of Health
Memorial University
Petro Canada (now Suncor Energy Inc.)*

A large offshore oil platform is situated in the middle of a vast, deep blue ocean. The platform is a complex of metal structures, including a tall derrick and various cranes. A bright yellow flame is visible coming from one of the platform's stacks. The horizon is a straight line in the distance, and the sky above is filled with soft, white clouds. The overall scene is a wide-angle shot of an industrial facility in a natural, maritime environment.

REDUCING CHALLENGES IN RESERVOIR SOURING

in Newfoundland and Labrador's offshore

BY JACKEY LOCKE AND MOIRA BAIRD

MEMORIAL RESEARCHERS ARE COMBINING their expertise to determine how offshore reservoirs sour and what can be done to mitigate the impact on oil and gas field infrastructure. The research is the first of its kind for offshore reservoirs in Canada.

Five researchers established a \$3.4-million partnership with Suncor Energy Inc. to identify the mechanisms, impacts and potential solutions of offshore reservoir souring. The team consists of Drs. Helen Zhang, Kelly

Hawboldt, and Amy Hsiao of the Faculty of Engineering and Applied Science, and Drs. Penny Morrill and Christina Bottaro of the Faculty of Science.

To enhance offshore oil and gas production, seawater is injected into the reservoir to promote the flow of hydrocarbons. When naturally-occurring sulfate in the seawater combines with sulfur compounds already present in petroleum, it can create corrosive sulfur compounds such as hydrogen sulfide (H₂S). This results

in increased costs for transporting and processing petroleum due to corrosion of platform equipment, and water-handling systems.

The multidisciplinary research focuses on delineating the sulfur cycle, corrosion control and improved production. It's an important step in developing production methods to maximize the extraction of petroleum from reservoirs. Similar research is being conducted in Western Canada on the challenges of onshore reservoir souring, but this project is a first in Canada on offshore reservoirs.

Dr. Hsiao is focusing on the characterization and prediction of corrosion in carbon low-alloy steels and corrosion-resistant alloys in sour acid gas environments. She is establishing a H₂S Standards and Materials Research and Testing (SMaRT) facility to investigate the interaction of these metallic surfaces in a variety of oil and gas production environments.

"The H₂S SMaRT lab will be the first of its kind in Canada. It will allow us to understand the corrosion phenomena that are being observed offshore as a result of souring," she said. "Suncor's initiative will result in important research in the prediction of long-term offshore asset integrity and the optimization of monitoring procedures."

Dr. Hawboldt and Dr. Bottaro are studying chemical sources of souring (such as seawater and production chemicals), the behaviour of sulfur compounds in the production system and solutions to mitigate souring.

"We're combining the biological souring process and the chemistry souring process to get a full understanding of how the process starts and propagates," Dr. Hawboldt said. "Suncor's vision was to integrate researchers from different backgrounds to get a complete understanding of the process and, thereby, develop solutions."

Dr. Bottaro echoes her colleague's enthusiasm for this integrated approach.

"This work has the potential to provide tangible solutions to challenges faced by oil extraction operations worldwide. As an analytical chemist, it is particularly rewarding to see our methods reach beyond the research lab."

Dr. Morrill and Dr. Zhang are investigating the interactions between sulfate-reducing bacteria (SRB) and nitrate-reducing bacteria (NRB), and examining their potential for inhibiting offshore reservoir souring using nitrate/nitrite injection to promote bacterial growth for environmental remediation.

As a biogeochemist, Dr. Morrill studies how extreme environmental conditions impact the naturally occurring microbial community and how habitats can be modified to encourage environmental remediation through microbial processes. "We will be contributing to the efforts of using the microbial community to reduce the production of sulfur compounds in reservoirs through a simple environmental modification."

Dr. Zhang says SRB are responsible for the majority of bacterial problems in oil production, and reservoir souring can be directly caused by SRB as a byproduct of microbial respiration. "Therefore, we can develop a cost-efficient SRB quantification methodology for our industrial partner.

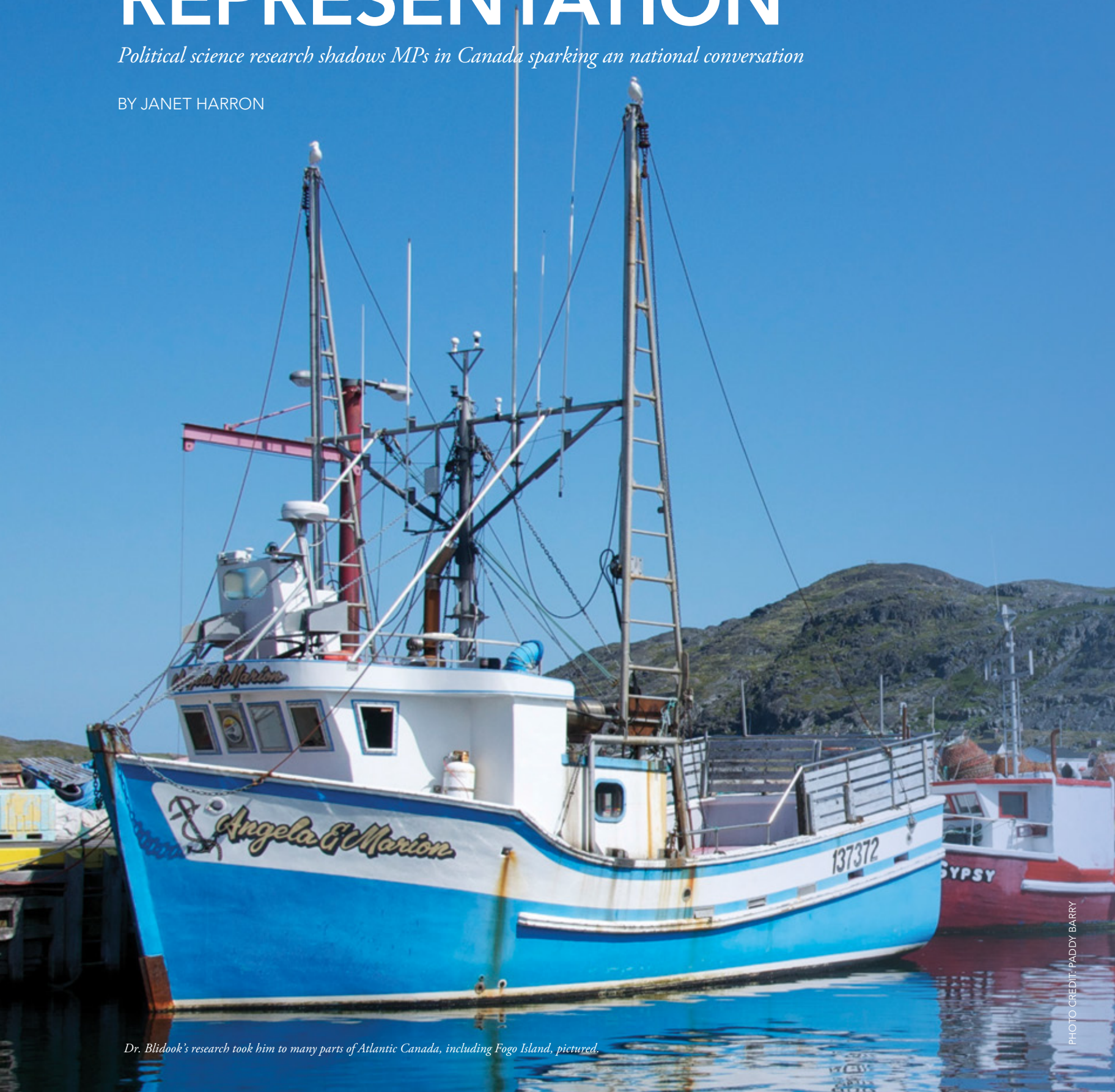
"In addition, the application of nitrates/nitrites could be very effective for reservoir souring control by promoting NRB, consuming nutrients that SRB require to grow and thus inhibiting SRB activity. By investigating optimal growth conditions for NRB and monitoring the byproducts naturally derived from NRB, we will help Suncor tackle SRB-triggered reservoir souring problems and, thus, reduce operational challenges in offshore oil and gas operations."

FUNDING: Suncor Energy Inc.

RESEARCHING REPRESENTATION

Political science research shadows MPs in Canada sparking an national conversation

BY JANET HARRON



Dr. Blidook's research took him to many parts of Atlantic Canada, including Fogo Island, pictured.

PHOTO CREDIT: PADDY BARRY

WHAT DO A REESE'S PEANUT BUTTER CUP and a trip to Fogo Island have in common?

For Dr. Kelly Blidook, an associate professor in political science, they each represent the various forms of collaboration involved in his SSHRC-funded research project on political representation.

Dr. Blidook studies MPs as closely as anyone in Canada. He is interested in how MPs represent those who elect them, how and why they each differ, and how that relates to current concerns about Canadian democracy.

Dr. Blidook and his colleagues Dr. Royce Koop, an associate professor from the Department of Political Studies at University of Manitoba, and Dr. Heather Bastedo, post-doctoral fellow at Queens University, are studying 11 MPs in both their home constituencies and in Ottawa.

"For all of us this is our first ethnographic project. Royce and Heather had started on this a little before me and were focusing on constituencies. And I had wanted to do this in Ottawa," explained Dr. Blidook. The three were together at a workshop when they did "the Reese's peanut butter cup thing" and decided to team up.

The 11 MPs were chosen on various factors, including party affiliation, gender, ethnicity and whether their constituencies were urban or rural.

Dr. Blidook's first experience shadowing an MP was a memorable weekend visit to Fogo Island (pictured) in 2013 during the annual Feile Tilting celebration with Liberal MP Scott Simms of Bonavista-Gander-Grand Falls-Windsor.

"His constituency is so big that when he goes to Fogo Island, he goes for a weekend. His assistant simply told me to meet him at the ferry dock and I ended up going in his car – we really had a great time together," said Dr. Blidook. The two served tables at brunch, participated in a local shed crawl, and heard some great music. He later visited Mr. Simms' two constituency offices, and accompanied him to various events including a Twillingate town hall on the Manolis L, the site of a well-known shipwreck in Newfoundland's Notre Dame Bay, which crashed in 1985.

"I came home with pages of notes," said Dr. Blidook. "It's balancing what can be seen cynically as electioneering



L-R: Liberal MP, Scott Simms and Dr. Kelly Blidook

with what the job actually requires. You see all kinds of stuff that would never have occurred to you before."

Halifax NDP MP Megan Leslie is another study participant. Her storefront constituency office in downtown Halifax also serves as a local art gallery. During Halifax's annual Nocturne Art at Night walk event, hundreds of people walk through the space which, according to Dr. Blidook, is a really unique way for people to access and become aware of their MP.

In Ottawa, Dr. Blidook witnessed a lot of late nights for Mr. Simms. And these didn't include shed crawls or church suppers.

"They were meeting on the Fair Elections Act and going clause by clause through the document," said Dr. Blidook, who sat in on both planning and committee meetings. "That's really what life there is like – working until 2 a.m. on bill amendments."

Dr. Blidook and his colleagues use four categories in determining how Canadian MPs represent their communities – policy, service, symbolic and party connections. By examining the ways that different MPs engage these connections, Dr. Blidook hopes his non-partisan work can help gain a deeper understanding into democratic practice.

"The more we know how democracy works, the more we can use it to make it work."

FUNDING: Social Sciences and Humanities Research Council of Canada

THE BUZZ ABOUT CRANBERRIES

SPECIAL FROM GRENFELL CAMPUS

THE NATIVE BUMBLEBEES of Newfoundland and Labrador have a special skill that makes them the champion of a healthy and productive cranberry farm. They use a specific type of pollination called “buzz pollination”.

Most plants carry their pollen in exposed, easy to reach places, so insects simply have to land on the blossom to pick up the pollen and carry it away. But cranberries are part of the 10 per cent of plants that carry their pollen in tubes. This is where buzz pollination comes in handy. The bee grasps the blossom in its jaws and rapidly vibrates its flight muscles without moving its wings. This shakes the blossom at just the right frequency to jiggle pollen out of the tube.

Cranberry farming is a relatively new industry in Newfoundland and Labrador, but it’s growing. In the fall of 2014, the federal and provincial governments invested \$7 million to develop the industry and there are now 15 cranberry farms in the province.

Commercial cranberry growers naturally want to maximize yield. The size of a cranberry is dependent on how many viable seeds it has. And the number of seeds is directly related to effective pollination. Healthy, plentiful bees mean more seeds, bigger cranberries and more fruit per hectare.

In some places, farmers import commercially raised bees to help the native pollinators do their work.

“Importing commercial bumble bees is problematic in two respects: the species is not native to the island so there is a risk of introducing a competing species, and they may carry parasites or diseases that could be spread to native bees,” said Dr. Julie Sircom, assistant professor, Environmental Science at Grenfell Campus. “The island of Newfoundland is one of the few places where certain devastating bee parasites are absent, so it is of great ecological and economic importance to prevent their introduction.”

Using field observations and geographic information systems (GIS) models, Dr. Sircom is studying the needs of bees, including food and shelter. She hopes to identify what native bee species need in order to be abundant, diverse and active pollinators.

The goal of Dr. Sircom’s research is to provide cranberry growers with simple, low-cost methods to maximize native bee populations. The idea is that increasing the number of native pollinators in commercial cranberry fields will increase fruit yields and ensure healthy native bee populations.

FUNDING: *Research & Development Corporation (RDC)*

Dr. Chris Tonelli (pictured) led a series of workshops that included dialogues with local and international musicians, artists, scholars and poets.

IMPROVISING SOUNDS

Fostering better communications through improvisation

BY KRISTA DAVIDSON

THE ACT (OR ART) OF IMPROVISING is to do or create something spontaneously, without preparation. Most of us improvise in our daily activities; whether you're talking on the phone with a friend, conversing with a colleague or ordering your lunch, you're improvising. Yet, improvisation, which is largely celebrated in the Arts, such as by way of music or theatre, is typically policed and controlled in other everyday settings.

Dr. Chris Tonelli is a 2014-2015 post-doctoral fellow with the International Institute for Critical Studies in Improvisation (IICSI) at Memorial University's School of Music. He is researching the histories and social effects of vocal and choral improvisation, with a focus on forms which incorporate extranormal voice techniques. Dr. Tonelli established Improvising Spaces, a monthly workshop and speaker series at Memorial that ran from October 2014 to April 2015. Consisting of seven workshops that featured musicians, conductors, dancers, poets, researchers, and even a chef from Raymond's, the series explored the ways improvisation can provide us with new ways of thinking and acting.

Dr. Tonelli completed the first year of his research at the University of Guelph in Ontario, under the IICSI (formerly, the Improvisation, Community, and Social Practice Project or ICASP), of which Memorial is a founding

member. The IICSI, which was funded through a seven-year Partnership Grant from SSHRC, is a network of five Canadian universities (University of Guelph, Memorial University, McGill University, University of Regina and the University of British Columbia) and founding partner Musagetes, an international organization that makes the arts more central and meaningful in people's lives, in our communities, and in our societies.

Dr. Ellen Waterman, dean with Memorial's School of Music, was part of the ICASP project, which was funded through SSHRC's Major Collaborative Research Initiative from 2007 to 2013. When Dr. Waterman joined Memorial, she brought with her improvisation research. Today, there are five faculty members from the school involved as research collaborators or co-investigators. Dr. Waterman serves as Memorial's site coordinator and member of the executive team for the institute. Dr. Tonelli, who had already established roots in the St. John's Arts community as a visiting assistant professor in Ethnomusicology and Popular Music Studies, was a natural fit to lead Improvising Spaces at Memorial.

The series, which was funded by the School of Music, focused on theorizing improvisation in interdisciplinary ways, with each discussion catering to a different theme and set of communities. Each of the workshops fostered

CONTINUED ON NEXT PAGE

collaborative dialogue from individuals from diverse communities and backgrounds so that audiences could see how improvising is relevant to their own lives and practices.

“The Institute is founded on the notion that thinking about improvisation can help us pursue social justice goals,” said Dr. Tonelli. “Improvisation is something that everyone does every day. There are ways of improvising in the arts that have implications for living well and fostering effective intercultural communication with other people around you. You learn to see and hear other people around you in a clearer and deeper way when you’re not blinded by pre-formed expectations.”

The workshops included local and international musicians, artists, scholars, poets and dancers to share their experiences and explore the relationships between various improvisatory practices. The series also brought in experts and artists from other communities and backgrounds: including dancers Karen Kaeja and Susanna Hood, Quebec-based musicians Éric Normand, Philippe Lauzier, and Scott Thomson, researcher and sound artist Lori Clarke, and Dr. Mario Blaser, a Canada Research Chair in Aboriginal Studies.

Dr. Tonelli holds a PhD from the University of California, San Diego, in Critical Studies and Experimental Practices in Music. He’s originally from Sudbury, Ont., and he completed an undergraduate degree in Cultural Studies from Trent University. He also served as a Visiting Lecturer in Contemporary Music and Culture at the New Zealand School of Music.

He says that improvisation: “...[is] both innovative and ordinary. Improvisation is simultaneously an idea that pushes against the norms and value systems of much of our culture, a skill we need to learn and practice and something we are always doing.”

Dr. Tonelli’s post-doctoral fellowship is co-funded by SSHRC in support of the IICSI and the Office of the Vice-President (Research) at Memorial. The Improvising Spaces series was supported with funding from the School of Music.

FUNDING: *Social Sciences and Humanities Research Council of Canada
Office of the Vice-President (Research),
Memorial University
School of Music, Memorial University*



ALL HANDS ON DECK

BY LESLIE EARLE

IN A SUCCESSFUL APPROACH that combines the unique strengths of academic, industry and government partners, researchers from the Marine Institute's Centre for Fisheries Ecosystem Research (CFER) are leading a collaborative effort to improve the management and maximize the value of Atlantic halibut fisheries in the Gulf of St. Lawrence.

Halibut is by far the most valuable fish per unit weight in the waters off Newfoundland and Labrador. However, both the absence of a reliable index of stock size in the Gulf of St. Lawrence and a lack of basic knowledge about the stock's seasonal movements, spawning behaviour, and habitat use, have slowed quota increases, even though the population is considered healthy.

The combination of professional fish harvesters' knowledge, coupled with the latest high-tech scientific devices, are helping to fill the knowledge gaps that currently impede further development of the fishery.

CFER scientists, fish harvesters from the Fisheries, Food and Allied Workers (FFAW), Department of Fisheries and Oceans scientists, and representatives from the Newfoundland and Labrador government are working towards the common goal of capturing such information. Further expertise is being brought in from International Pacific Halibut Commission (IPHC) on satellite tagging techniques and data interpretation, and the Gulf of Maine Research Institute to model habitat use and seasonal migrations. The project is supported with funding from the province's Department of Fisheries and Aquaculture and the Research & Development Corporation's IgniteR&D program.

"This academic-industry-government partnership represents what we believe is a fundamental model of conducting collaborative fisheries research. The partners each have a unique and important role to play in the project, whether by providing resources, input, time or technology," said Dr. Dominique Robert, CFER scientist and co-leader of the study.

Fish harvesters have been an essential partner in the research, helping with the overall study design as well as coordinating the logistics of satellite tagging surveys.



L-R: Dr. Jonathan Fisher, Dr. Hannah Murphy and DFO Scientist Martin Castonguay.

"With their extensive knowledge of halibut fishing grounds, FFAW harvesters are supporting the work of scientists by facilitating field work and ensuring all satellite tags can be successfully deployed within a short time frame. Their collaboration is a critical component to the success of this project," said Jason Spingle, staff representative, FFAW.

While at sea in 2013 and 2014, fish harvesters led science staff to the fish, and CFER oversaw the deployment of pop-up satellite archival tags that record the temperatures, depths, and light levels experienced by halibut over a full yearly cycle. The high-tech tags pop off after recording for a full year and transmit their data to the scientists via the Argos satellite system.

Federally, DFO is supporting the project by actively contributing to the tagging work at sea and incorporating the information obtained into its stock assessment process.

After retrieving data from the first year of tag deployments, scientists have been able to identify the timing and location of spawning, estimate the seasonal migration, and determine depth and temperature preferences of halibut. In 2013, data was recovered from 15 of the 20 tags deployed; in 2014, 24 fish tags were deployed and data will be obtained in September 2015. The knowledge acquired in this project will improve assessment advice that governs use of the halibut resources and contribute to increasing the value of one of the most important fisheries on the west coast of Newfoundland.

Overall, this research contributes directly to CFER's mandate to both focus research on the sustainability of Newfoundland and Labrador fisheries and to collaborate with industry and management partners to best achieve this common goal.

FUNDING: Department of Fisheries and Aquaculture,
Government of Newfoundland and Labrador
Research & Development Corporation

CASE STUDY OFFERS INSIGHT INTO MINDS OF ENTREPRENEURS

BY SUSAN WHITE

A COLLABORATION between faculty members and a grad student at the Faculty of Business Administration has led to a unique case study that offers a glimpse into the struggle of entrepreneurs to balance personal lifestyle with a firm's growth potential.

MBA student Deborah Walker, along with Dr. Dennis Hanlon and Prof. Donna Stapleton, undertook a case study of Beaufort Solutions Inc., a technology company based in St. John's that operates in the rapidly-developing digital imaging and printing industry. The resulting case study has been published this past spring in *Case Research Journal (CRJ)*, the leading academic journal for cases in business and related disciplines in North America.

Ms. Walker began the study as an independent research project supervised by professors Hanlon and Stapleton. She had worked on a part-time basis with the owners of Beaufort Solutions and felt that the company was a prime candidate for a case study offering a rare look at the behind-the-scenes processes, conversations and players during a pivotal time in a business's growth.

Ms. Walker presented an early version of the case and placed third at an international entrepreneurship student case writing competition in New Orleans, La. Funding for Ms. Walker's research was provided by the Faculty of Business Administration, Student Affairs and Services, the School of Graduate Studies and professors Stapleton and Hanlon.

"My main goal in writing the Beaufort case was to capture a real-life example of entrepreneurial struggle and opportunity," she said. "My relationship with the owners and my knowledge of their business afforded a unique opportunity to document their history and the business opportunities and challenges they were facing at the time."

Ms. Walker and her supervisors brought together their



PHOTO CREDIT: KAREN ROCHE

L-R: Prof. Donna Stapleton, Deborah Walker and Dr. Dennis Hanlon

respective areas of expertise – accounting for Ms. Walker, entrepreneurship for Dr. Hanlon and marketing for Prof. Stapleton – to develop the case study and accompanying instructor's manual, which may now be used in undergraduate and graduate courses in entrepreneurship and strategic management.

Prof. Stapleton says this case study is unique because of the emphasis it places on the entrepreneurs as individuals and on the ways in which their attitudes and values about lifestyle, money and growth influence the development of their businesses.

"Much of the value stems from the fact that it is not a traditional strategy decision-making case," she said.

"Instead, students [who examine this case study] must grapple with a much more fundamental choice about how much growth to pursue, taking into account the life situations, values and personal preferences of the owners along with the internal and external realities of the firm."

"Unlike large, publicly-traded companies, the primary motivation of entrepreneurs is not necessarily wealth maximization. Yet, to our knowledge, no framework has been developed specifically to guide the analysis of these types of choices," added Dr. Hanlon.

Cases published in *CRJ* are distributed directly to libraries and subscribers as well as through publishing partners, which makes them available to university professors around the world. Only 16 per cent of cases are accepted for publication.

FUNDING: Faculty of Business Administration, Memorial University
Student Life, Memorial University
School of Graduate Studies, Memorial University
Professors Stapleton and Hanlon, Memorial University

CLINICAL COLLABORATION

Improving quality of life for those living with chronic illness

BY HEIDI WICKS

AN INTERDISCIPLINARY TEAM AT MEMORIAL is conducting vital research to discover the most effective, accessible and sustainable methods of care for patients living with chronic illness by exploring how a pharmacist and nurse-led clinic can improve quality of life. The model is innovative as it further utilizes intervention from primary (first point-of-contact) health care practitioners. Whereas a typical model involves a patient referral to a specialist physician, this team's design features pharmacist/nurse intervention in between specialist visits.

The team consists of Dr. Debbie Kelly, an associate professor with the School of Pharmacy and cross-appointed to the Faculty of Medicine; Dr. Jason Kielly, an assistant professor from the School of Pharmacy and Eastern Health; Dr. Shabnam Asghari, assistant professor with the Division of Family Medicine, Faculty of Medicine; Kimberley Burt, a nurse practitioner with Eastern Health; and pharmacy student Jessica Biggins.

The team received partial funding through a larger, nationwide Canadian Institute of Health Research (CIHR) study that is designed to support those living with HIV.

Dr. Kelly explained that this design to provide supplemental care is not meant to replace the full-care clinic, which includes a specialist physician, but instead complements that usual model.

"In Newfoundland and Labrador, all patients are seen by a full multidisciplinary team (which includes a pharmacist, nurse practitioner, social worker and physician) at least once a year, but some will also receive a visit through the nurse-pharmacist (non-physician) clinic for alternate visits. The result is that patients can access appointments with our HIV care team faster with shorter waitlists."

A telephone patient satisfaction survey was administered to clinic patients who attended the multidisciplinary clinic or the nurse-pharmacist clinic between January and July 2014. Results indicated patients were highly satisfied with care received through both delivery models.

When the survey was presented at the Canadian Society of Hospital Pharmacists (CSHP) national conference earlier this year, the idea of this novel clinical practice for pharmacists was met with great interest.



Dr. Debbie Kelly and Dr. Jason Kielly

PHOTO CREDIT: KAREN ROCHE

FIRST CLINIC IN CANADA TO ACTION THIS MODEL

"There is ample evidence supporting the model of a pharmacist or pharmacist-nurse led clinic to manage many chronic conditions, such as diabetes, high cholesterol and heart failure. But we were the first clinic in Canada to implement this clinic model for chronic HIV care. This model was developed largely out of necessity when the infectious disease specialists left the province in 2009 and we were without a regular clinic physician for a year and a half."

Dr. Kelly added that the clinics were so well received by both patients and new physicians, and were so effective in managing wait lists that some of her colleagues have continued to offer them.

"Since we started, I am aware of another pharmacist-nurse clinic for HIV care in Calgary, and I've been approached by other colleagues across the country who are also considering this model of care."

One of the school's strategic goals over the coming months is to develop a Medication Therapy Services Clinic (MTSC), which will focus on innovative and unique ways to practice pharmacy - offering services where patients with complex medication-related needs can have one-on-one, comprehensive assessments in a private environment.

Dr. Kelly, who is leading the initiative, described numerous groundbreaking initiatives the clinic will enable.

"The MTSC will not only be a teaching and learning site for pharmacy students, but will support the province's health strategy to improve patients' access to the type of care they need, when they need it. And just as equally, we are committed to measuring the impact of care provided through the clinic. Our research and evaluation strategy will enable many more projects around the value proposition of pharmacists practicing to their full scope and working more collaboratively with other health care disciplines."

FUNDING: Canadian Institutes of Health Research

DIVING INTO THE MYSTERIES OF SMITH SOUND

Multidisciplinary research spans the faculties of Engineering and Applied Science, Science and Arts

BY JACKIE LOCKE AND MOIRA BAIRD

Dr. Dan Walker, professor with the Faculty of Engineering and Applied Science

A TEAM of Memorial University researchers are delving into the deepwater mysteries of Smith Sound, a 27-kilometre-long fjord that stretches from Clarenville into western Trinity Bay, and other coastal areas of Newfoundland and Labrador.

Researchers from three faculties – Engineering and Applied Science, Science, and Arts – are using an explorer-class autonomous underwater vehicle (AUV) to map the seafloor, detect 19th-century shipwrecks and shed light on the importance of Smith Sound’s seafloor habitat to Atlantic cod. This collaborative initiative is part of a research project called Responsive AUV Localization and Mapping (REALM). REALM aims to fully utilize the AUV and the collected data to aid a variety of research topics.

Rated to dive up to three kilometres below the surface of the ocean, the Explorer is a versatile tool operated by the multidisciplinary Marine Environmental Research Laboratory for Intelligent Vehicles (MERLIN) within the Faculty of Engineering and Applied Science.

Dr. Dan Walker, faculty lead at MERLIN and one of the principal investigators in the REALM project, says the AUV was used for a preliminary multi-beam survey from the surface of Smith Sound in June 2014.

“It provided an accurate map of the bottom of the Smith Sound. During phase two, in early July, the AUV dove to within 20 metres of the bottom collecting side-scan sonar data to provide photo-like images of the seafloor.”

While multi-beam data shows the bottom contours and maps the shape of the seafloor, the side-scan data generates images that can differentiate potential targets, such as shipwrecks. Members of the team with an interest in archeology used this data to establish the potential locations of fishing vessels that may have sunk during an August hailstorm in the late 1800s.

“Those shipwrecks remain a mystery today,” Dr. Walker said. “Validating those sites will require additional missions.”

He says the MERLIN team will follow a similar approach used near Holyrood in Conception Bay – returning to a potential wreck site identified during technology trials in 2013.

“Undertaking an orthogonal side-scan survey, the team discovered a schooner of approximately 20 metres in length with its two masts clearly lying on the seafloor in some 90 metres of water. The next step on the Conception Bay site is to either mount a camera on the AUV or follow up with a remotely operated vehicle to more fully explore this exciting find.”

Dr. Neil Kennedy of the Department of History says the sonar images are striking and provide valuable information.

“One of the ways we can understand the evolution of maritime technology in my period, that is the 17th and 18th centuries, is through shipwrecks because there are only a handful of surviving vessels.”

He plans to correlate the wreck sites with Memorial’s Maritime History Archive’s shipwreck database and has also notified the provincial archaeology office about the vessels.

“There are concerns about human remains ... so a set of criteria will be developed this summer to guide future research.”

Dr. Walker says the research doesn’t end there – the AUV is also being utilized to develop a comprehensive map of benthos, or the seafloor biology, in Smith Sound.

Master’s student Katherine Macpherson of the Department of Geography’s Marine Geomatics Lab says the surveys covered 37 square kilometres of seafloor. Gathering data about the seafloor’s shape, sediments and the species living there could help researchers better understand why the fjord is so important to cod.

While Smith Sound has been intensely studied for more than 20 years, she says much of that research has focused on the water column. Little information has been collected on the seafloor component of the ecosystem.

Preliminary survey results indicate that a variety of habitats exist in Smith Sound.

“As suspected, the areas where cod have known to form spawning columns are characterised by soft sediments and high water flow. Lots of worms live in these areas, and at some point I will be trying to determine whether they provide some sustenance for cod in the area.

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The AUV was used to map the sea floor of Smith Sound for the REALM project.

"The next phase for the research is to map the organisms and sediments across the seafloor area, using the environmental information as an indicator of their preferred habitat. Using this seafloor habitat map, we will look at any spatial relationships that cod may have with the seafloor," Ms. Macpherson said.

Dr. Walker says this information may enable researchers to piece together the reasons for the strong cod populations in Smith Sound.

REALM project partners include ACOA's Atlantic Innovation Fund, Research and Development Corporation of Newfoundland and Labrador, Memorial University and the Marine Institute, Fugro GeoSurvey Inc., PanGeo Subsea Inc. and International Submarine Engineering Research Ltd.

FUNDING: *Atlantic Canada Opportunities Agency
Research & Development Corporation (RDC)
Memorial University
Fisheries and Marine Institute
Fugro GeoSurvey Inc.
PanGeo Subsea Inc.
International Submarine Engineering Ltd.*

SETTLING IN

Social work researcher collaborates to help newcomers to Labrador West

BY LAURA WOODFORD

IMAGINE LEAVING YOUR FAMILY AND FRIENDS

behind to start a new life in a different country. The country is a lot colder than you are used to, the customs are very different and the people speak a different language. Imagine you don't know where to go to get help finding accommodations or assistance with improving your language skills. This is the reality for many Filipino newcomers to Labrador West.

Dr. Delores Mullings, assistant professor at the School of Social Work, has long been interested in settlement issues often faced by people who are new to an area, including connecting with a community, emotional well-being and interdependence on others.

The impetus for this research project came from a regional workshop offered through the Harris Centre, where participants voiced concerns about newcomers to Labrador West not being as integrated as they could be into the local community. Funding was secured through Memorial's Office of Public Engagement, as well as the provincial government.

Dr. Mullings teamed up with independent researcher Dr. Willow Anderson, who was interested in settlement patterns relating to issues with newcomers in rural Newfoundland. Together, they formed a Community Advisory Group, comprised of Ms. Noreen Careen, Labrador West Status of Women Council, Ms. Patsy Ralph, Labrador West Chamber of Commerce, and Inspector Paula Walsh, Royal Newfoundland Constabulary, which oversaw the research project.

"It was a real collaboration," said Dr. Mullings. "The Community Advisory Group very much directed the research. They paved the way for us to meet people and build rapport in order to enable some frank discussions."

Dr. Mullings said they were also very thankful to have a number of individuals collaborating with them, including Hazel Ouano-Alpuerto, Philippines Honorary Consul



L-R: Inspector Paula Walsh, Mayor Karen Oldford, Dr. Willow Anderson, Noreen Careen, Dr. Delores Mullings

General in St. John's, N.L., HG (a key informant), POGI Oriental Goods Store (a Filipino grocery store) and another business that wished to remain anonymous.

Dr. Mullings and Dr. Anderson visited Labrador West in June and November 2014, and met with the Community Advisory Group, the Office of Public Engagement Regional Council, community groups, the mayor of Wabush and one of the businesses that hires many temporary foreign workers. They wanted to have a presence in the community and be visible to potential participants and community groups to spread the word about the research project and generally engage the community. They attended a game of the Filipino-Canadian basketball league and took part in the celebrations for Philippine Independence Day.

"We started with an online survey to determine the needs of newcomers," said Dr. Mullings. "We soon learned that some people preferred talking face-to-face, so we enlisted the help of the collaborators to distribute flyers to recruit participants. We scheduled visits at the Filipino grocery store and held focus groups and individual interviews."

The findings indicated that newcomers were struggling to fit into their new surroundings and felt isolated. Some were exhausted, working overtime to make money to support families overseas. Despite the challenges, many stated positive factors such as the friendly people and

low crime rate, which motivated them to integrate and stay in the region.

The Community Advisory Group provided feedback on the draft report and a final report has been submitted to the provincial Office of Public Engagement, with several recommendations to support the settlement of newcomers in Labrador West.

Drs. Mullings and Anderson will report the findings to the community through the Harris Centre and POGI Oriental Goods Store.

Dr. Mullings sums it up: "Social workers are committed to helping build individual and community capacity. By collaborating with the community for this research, we hope to generate larger discussions and influence policy that will contribute to improved program planning and implementation to serve newcomers' needs in Labrador. Dr. Anderson and I hope our research will have farther-reaching impact; we plan to disseminate the findings widely."

FUNDING: Office of Public Engagement, Memorial University
Office of Public Engagement, Government of Newfoundland and Labrador
Town of Wabush
Town of Labrador City



THE RIGHT TREATMENT AT THE RIGHT TIME

An unprecedented \$51.9-million partnership to provide enhanced, personalized patient care through collaborative, multidisciplinary research

BY VIRGINIA MIDDLETON

Graduate Cindy Penney in one of the new labs in the Craig L. Dobbin Genetics Research Centre.

PHOTO CREDIT: JOHN CROWELL

TRANSLATING GENETIC DISCOVERIES into medical treatments is a huge challenge, but one that may make an incredible difference in a patient's life.

"In many cases, the basic bench science is already done," says the Faculty of Medicine's Dr. Patrick Parfrey. "The biomarkers have been found, the genes responsible have been discovered, but up to 80 per cent of that work is never translated into practice in any meaningful way."

And if an intervention is distilled out of a discovery made at the lab bench, the next challenge is ensuring the information or treatment gets to the right patient. Then the big question is deciding what the best treatment is and when it should happen.

Addressing these gaps – from discovery to intervention to delivery — is at the heart of the Translational and Personalized Medicine Initiative (the TPMI). This \$51.9-million public-private partnership draws in stakeholders at all levels, from academics to the public, and from provincial policy-makers to the large software leader IBM. Chief Scientific Officer of the project, Dr. Patrick Parfrey, states the TPMI is more than a single project – it is more like an umbrella initiative and includes researchers from many areas of genetics and health projects. Research under TPMI will primarily be housed in the new Craig L. Dobbin Genetics Research Centre in St. John's, N.L.

Some researchers work in teams that focus on finding new genes that may contribute to disease in the Newfoundland and Labrador population, while other researchers are focussing on improving the quality of health care in the province.

This also provides graduate students who are researching in different areas an opportunity to collaborate, access data and receive mentoring that will advance their research and discoveries. Students are already engaged in meaningful research: Hoda Rajabi is part of the translational genetics program for Stargardt's disorder (a hereditary eye disorder); Cindy Penney is researching hereditary hearing loss with a focus on sensorineural hearing loss; and Justin Pater is researching Arrhythmogenic Right Ventricular Cardiomyopathy (sudden heart death).

The goal is to move research from the bench to the

patient's bedside, resulting in better care that is more cost-efficient. The research teams will work to ensure that the right interventions are developed for the right patients and delivered at the right time.

The Centre of Health Informatics and Analytics (CHIA) is a major program under the TPMI. Through CHIA, Memorial researchers will have access to one of Atlantic Canada's fastest computing environments. CHIA uses high-performance computational infrastructure to facilitate research into patient outcomes and offer insight into how to improve health care services. The results of this research may help physicians provide better health care through, for example, personalized screening in clinical research centres.

CHIA's new computer system and personnel will be available to assist in examining big data (such as decades of genetics research) and in developing point-of-care decision-making software to ensure that the people at the greatest risk of developing conditions, such as colorectal cancer, receive the preventive care they need. Analysts and experts at CHIA will also assist with the review and analysis of prescription data to develop and disseminate best practices and create new policies in drug usage for long-term care facilities.

The personnel and equipment required to carry out these projects, and the projects themselves, represent a significant investment by IBM, RDC, the Government of Newfoundland and Labrador, the Government of Canada, and Memorial University.

Health research in the province is changing. The TPMI focuses on research which aims for direct, measurable improvements in patient outcomes, whether through new therapies or devices, better targeted delivery of interventions, or simply greater efficiency in service.

The TPMI is laying the groundwork for a new research culture which is, at its core, patient-oriented and dedicated to addressing the needs of the people whom the health care system itself is pledged to serve.

FUNDING: *Canadian Institutes of Health Research
Atlantic Canada Opportunities Agency
Government of Newfoundland and Labrador
IBM Canada
Research and Development Corporation*



CONNECTING COMMUNITIES

Improving mental health and wellness in Indigenous boys and men

BY KRISTA DAVIDSON

EVERY YEAR, THOUSANDS OF MEN across the globe don moustaches in support of Movember, an international campaign that raises awareness and funds for men's health issues. This widely recognized campaign also has a local connection thanks in part to the work of researchers in Labrador.

Nathaniel Pollock, a PhD candidate in the Faculty of Medicine, and Dr. Andrea Proctor, a post-doctoral fellow at the Labrador Institute, are working on a project co-led by Dr. Michael Jong from Labrador-Grenfell Health and the Faculty of Medicine, and Gwen Healey from the

Qaujigiartiit Health Research Centre in Iqaluit, along with the Nunatsiavut Government, and other researchers and Indigenous organizations in Nunavut, Northwest Territories, and the Yukon.

They were awarded a \$3 million grant from the Movember Foundation to deliver and evaluate community initiatives to promote mental health among Indigenous men and boys.

Research indicates that Inuit and First Nation males are three to 11 times more likely to be impacted by

PHOTO CREDIT: KEITH LEVESQUE - ARCTICNET

suicide than their non-Indigenous peers. This alarming statistic has been widely attributed to colonial policies and actions such as residential schooling, forced settlement and relocation and to the ongoing inequality experienced by many northern communities. Together, these historical and contemporary social factors have been detrimental to the mental health of Indigenous people.

The project is called Pathways to Mental Wellness for Indigenous Boys and Men: Community-led and Land-based Programs in the Canadian North. It aims to improve mental health and wellness of up to 600 Indigenous men and boys by involving them in land-based interventions. These interventions seek to revitalize both personal and community connections by blending culturally-adapted mental health services with traditional skills and activities such as hunting and harvesting, tool-making and land navigation.

Overall, these activities target factors that promote mental wellness and protect against suicide risks, including cultural identity, personal agency, social support and a sense of community belonging.

“Indigenous peoples contend that their relationship with the land shapes the cultural, spiritual, emotional, physical and social lives of individuals and communities,” said Dr. Jong. The project spans seven communities in Labrador, Nunavut, Northwest Territories and the Yukon. The project also brings together researchers, community members and organizations to design, pilot and evaluate the impact of land-based mental health interventions over a three-year period.

This project grew out of collaboration between Indigenous communities, health system stakeholders, and researchers, including the recently announced Arctic Fullbright Scholar, Susan Chatwood, from the Institute of Circumpolar Health Research in Yellowknife. In 2013, under Dr. Chatwood’s leadership, the team was awarded a \$250,000 CIHR-Arctic Council grant to help develop the evidence base for suicide prevention in the Arctic. The Movember project builds on this initial work, and includes international partners from Greenland, Norway, Finland and Sweden.

The team consists of individuals, community members and researchers from various sectors and disciplines, including the justice system, education, social work, health and Indigenous leaders.

“For us, it’s important to support communities to share their expertise and document some of the ways these programs have impacted the lives of participants. We are also really interested in understanding the possible broader effects of land-based programs on community health,” said Mr. Pollock.

“Knowledge translation is in part about sharing evidence and best practices in land-based and community-driven mental health interventions. There are really innovative and positive health initiatives coming out of Labrador and elsewhere in the North. We want our experience to help other communities build their own programs, connect with decision makers and secure sustainable funding. ”

The research adopts a mixed method approach that takes advantage of the collaboration between Indigenous and scientific knowledge to identify the aspects of land-based programs that will enhance protective factors such as self-esteem, ability to cope with stress and social support.

Dr. Jong emphasizes the importance of collaboration, not just among different sectors and specialties, but also among the communities involved.

“To be effective the communities have to run and own their projects,” said Dr. Jong. “We can learn from others, we do not need to reinvent, but we do need to adapt the learnings to each community,” he said, adding that the programs are “for us and by us.”

The Movember Foundation announced an investment of \$7.9 million for three large-scale collaborative projects through the Canadian Mental Health Initiative. \$3 million of that funding was awarded to support Dr. Jong and Ms. Healey’s Pathways research.

FUNDING: *Movember Foundation through the Canadian Mental Health Initiative*





PHOTO CREDIT: CHRIS HAMMOND

L-R: Drs. Erin Cameron and Erin McGowan

HIPP TO COLLABORATE

BY SANDY WOOLFREY-FAHEY

AS A WAY TO FACILITATE KNOWLEDGE translation to the community, two enthusiastic young scholars have come together to unite their passion and research to form the Health Innovation through Promotion and Practice (HIPP) collaborative.

Drs. Erin Cameron and Erin McGowan, assistant professors with the School of Human Kinetics and Recreation at Memorial University, are leading HIPP. They are inspired by the synergy of their research in health promotion and by a shared commitment to linking research to practice.

"We have ambitious plans for HIPP," said Dr. Cameron. "Our vision is for HIPP to be a hub for activities and events, and provide an opportunity to connect people on co-research initiatives to establish innovative research areas and creative methodologies."

Drs. Cameron and McGowan's current collaborations focus on studying health interventions involving physical activity and experiential learning. The duo recently received funding through the Office of the Vice-President (Research)'s Seed, Bridge, and Multidisciplinary Fund for their first collaborative project, Sizing up Stigma: Exploring the Perceptions and Experiences of Prostate Cancer Survivors with Health-Related Stigma. In a recent statement, Prostate Cancer Canada identified cancer stigma as a key topic area to be addressed.

Both Drs. Cameron and McGowan are also mothers of young children and commit daily to being examples to their kids of living active healthy lives. They promote, practice, and teach by example. The HIPP collaborative is an extension of their approach to life.

CONTINUED ON NEXT PAGE

"The Collaborative is an opportunity to promote the work we do, and the work of others, while making important linkages with community," explained Dr. McGowan. "We are dedicated to innovation and excellence in promoting health."

Dr. McGowan has expertise in exercise and health psychology, behavioural medicine, physical activity and cancer and cancer prevention. She is actively involved in the prostate cancer community in Newfoundland and Labrador, and is the leader on numerous provincial and national research projects.

Dr. Cameron's expertise is in health education, health promotion and health pedagogy. Specifically, her work in stigma-reducing pedagogies has earned her international recognition, and is the focus of a forthcoming co-edited book.

HIPP was founded on the philosophy that by bringing individual research successes and interests together, the possibilities of collaboration increase exponentially. Drs. Cameron and McGowan are also reaching out in their own unique and innovative way to build capacity to push research into practice and improve productivity.

"Much of the work of our faculty, including the work of Drs. Cameron and McGowan has the ability to translate to and benefit the people of Newfoundland and Labrador and beyond," said Dr. Heather Carnahan, dean of Memorial's School of Human Kinetics and Recreation. "Collaborative efforts like HIPP allow us to bring together energy and resources to fuel knowledge creation and innovation, and the potential results are really exciting."

HIPP will incorporate research, teaching and learning, training, community and university service, public engagement, and knowledge dissemination. Drs. Cameron and McGowan want to connect with colleagues, research and community partners who might be interested in joining the collaborative. As a HIPP collaborator, a participant's work will be highlighted on the HIPP website and linked to other collaborators doing work in the area of health promotion.

You can follow HIPP on twitter @HIPPCollab.

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

MAKING A BETTER FISH FEED

International collaborative research to fine-tune fish feeds

BY KELLY FOSS

Researchers in the Department of Ocean Sciences are collaborating on a \$3.8 million international partnership to assess the effects of various diets on fish health at a molecular level.

The Biomarker Platform for Commercial Aquaculture Feed Development project is co-led by Dr. Matthew Rise, Department of Ocean Sciences and Dr. Richard Taylor, senior research scientist at EWOS Innovation, (the research and development arm of EWOS Canada) and EWOS, (a world-leading fish feed producer).

Together with Dr. Chris Parrish, also with the Department of Ocean Sciences, the team will use genomics technologies and lipid biochemistry to fine-tune feed formulas that include non-marine products (such as land-based plants) for maximizing fish performance and to develop clinical feeds that will combat disease.

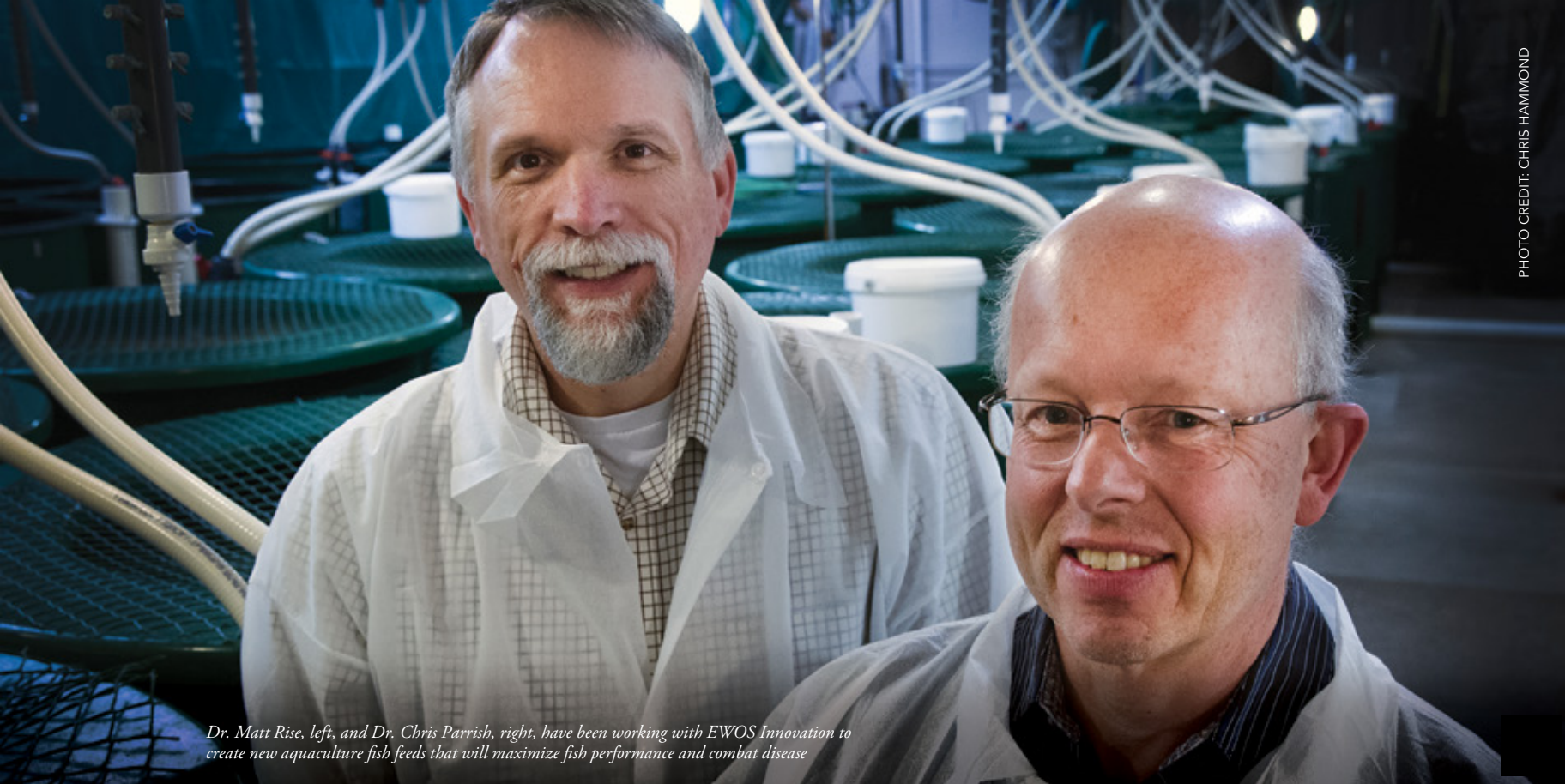
"Part of the impetus of this project is that the fish oil and fish meal traditionally used in salmon feeds is from forage fish, (like anchovies, herring and capelin), the supply of which has plateaued and may actually be decreasing, while aquaculture is continuing to grow to supply the global demand for fish," said Dr. Rise. "So there's a need to find alternatives that promote growth and health but are economically feasible and sustainable."

One of the oils the team is testing is rapeseed, from which canola is derived.

"This oil differs chemically from any that these animals would feed on in the wild," explained Dr. Parrish. "So the biochemistry changes. When you start to replace a huge amount of fish oil with terrestrial seed oils, this leads to issues of how well the animals deal with what (to them) is a very unusual fatty acid profile."

Dr. Parrish is responsible for investigating this side of the project, while Dr. Rise's group uses functional genomics techniques to identify and validate health-relevant biomarker genes that respond to diets or diet ingredients.

Dr. Rise is using microarrays, or gene chips, which have tens of thousands of genes printed on them, to identify genes that respond to a diet that has a favourable effect on growth or disease resistance. Microarrays enable a complete picture of how these new diets are affecting



Dr. Matt Rise, left, and Dr. Chris Parrish, right, have been working with EWOS Innovation to create new aquaculture fish feeds that will maximize fish performance and combat disease

performance and health.

The expected outcome of this project is a set of the best and most predictive molecular biomarkers that can be used as a tool to screen new feed ingredients and diets in order to give an overall set of data on how these diets affect fish health. While advantageous to the feed producers, the development of these advanced diets would also benefit aquaculture producers in Canada and around the world.

Team members from Memorial include Maryam Beheshti Foroutani (a master's student working with Dr. Parrish), PhD student Khalil Eslamloo, and post-doctoral fellow Dr. Albert Caballero Solares, (both working with Dr. Rise). The team also includes a full time technician, Xi Xue, two part-time technicians, Jennifer Hall and Jeanette Wells, and part-time project manager Cara Kirkpatrick.

As the research and feeding trials with various diets continue at Memorial, other feeding trials in this project are also ongoing at EWOS Innovation in Norway. Dr. Rise reports that the project has also increased collaboration here at home.

"Chris and I have started working more closely together," he said. "The cooperation of a molecular gene expression lab and a fatty acid/lipids biochemistry lab is a very powerful collaboration that you don't see very often. That's one advantage of having different complementary people in the same institution."

They are also making full use of the facilities at the Ocean Sciences Centre at Logy Bay – in particular, the Dr. Joe Brown Aquatic Research Building (JBARB) and the Cold-Ocean Deep-Sea Research Facility (CDRF).

"The work really leverages previous federal and provincial investments into the Ocean Sciences Centre," added Dr. Rise. "It couldn't happen if we didn't have the world-class infrastructure that we have here. The JBARB is currently running a large-scale feeding trial in 28 tanks. That's a lot of fish, which requires husbandry skills, water quality monitoring and more skills and services which constitute the expertise of the JBARB team. We expect our new Canada Foundation for Innovation and Research & Development Corporation-funded CDRF building will also become a big part of the project for histology, microscopy, flow cytometry, and possibly bio-containment requirements."

Dr. Rise's lab contains equipment funded by CFI as well as RDC. Dr. Parrish's lipid biochemistry equipment was primarily funded by the Natural Sciences and Engineering Research Council of Canada (NSERC), with RDC also providing funding for students.

Drs. Rise and Parrish worked closely with EWOS Innovation and Genome Atlantic to develop the proposal and secure funding. The project is funded in part by Genome Canada through their Genomic Applications Partnership Program, a competition designed to encourage industry-academic collaborations to increase innovation and competitiveness through genomics.

Ewos Innovation matched Genome Canada's contribution to help fund the project.

FUNDING: Genome Canada
EWOS Innovation

#WEARERESEARCH ST★RS



DR. BEVERLY DIAMOND (a Tier 1 Canada Research Chair in Traditional Music/Ethnomusicology, and faculty member in the School of Music, with a cross-appointment to the Department of Folklore, Faculty of Arts), received the 2014 SSHRC Impact **Gold Medal**, the highest honour a researcher can receive in Canada for research in the social sciences and humanities. The award was made by the Social Sciences and Humanities Research Council of Canada, and is valued at \$100,000.

KIRK LUTHER (PhD candidate in the Department of Psychology, Faculty of Science) was recognized for his research in child interviewing and eyewitness accounts with the SSHRC Impact Talent Award, valued at \$50,000.



DR. LARRY FELT (a retired faculty member who was with the Department of Sociology for more than 38 years), received the inaugural Marilyn Harvey Award to Recognize the Importance of Research Ethics in the winter 2015.



DR. MICHELLE PLOUGHMAN (an assistant professor with the Division of Medicine, Faculty of Medicine) was named a Tier 2 Canada Research Chair in Rehabilitation, Neuroplasticity and Brain Recovery.

DR. CRAIG S. MOORE (assistant professor with the Division of Neurosciences, Faculty of Medicine, and cross appointed with the Discipline of Medicine, Neurology Division, Division of BioMedical Studies) was named a Tier 2 Canada Research Chair in Neurosciences and Brain Repair.



DR. TREVOR VANDENBOER (Department of Earth Sciences, Faculty of Science) was awarded Memorial's first Banting Postdoctoral Fellowship. Valued at \$70,000 over two years, the award recognizes the "very best postdoctoral applicant, both nationally and internationally, who will positively contribute to the country's economic, social and research-based growth."



DR. BING CHEN, (Faculty of Engineering and Applied Science) was named the 2014 Terra Nova Young Innovator. The award reflects a shared commitment between Memorial University and Suncor Energy Ltd. to recognize outstanding faculty members whose research is innovative and has potential for a significant impact on society.

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L-R: Dr. Trevor Bell, Dr. Sean Brosnan and Dr. Andrew Staniland.

SEVERAL RESEARCHERS were recognized at Memorial's President's Awards: Dr. Sean Brosnan (Department of Biochemistry, Faculty of Science) was awarded the 2014 John Lewis Paton Distinguished University Professorship; Dr. Trevor Bell (Department of Geography, Faculty of Arts), and Dr. Christopher Kovacs (Faculty of Medicine) were named University Research Professors; Dr. Andrew Staniland (School of Music) received the President's Award for Outstanding Research.

FUNDING ANNOUNCEMENTS AND OPENINGS



Memorial celebrated RDC's investment in ocean industries student research in the fall 2014.

MEMORIAL'S FACULTY of Engineering and Applied Science received a significant investment in offshore engineering research in Newfoundland and Labrador. The new Suncor Energy Offshore Research Development Centre is a 1,090 square-meter extension of the S.J. Carew building, designed to create significant opportunities for research, training and collaboration with industry partners. The investment was supported by Suncor Energy and RDC. The \$6.8 million expansion officially opened in December 2014.

IN THE FALL OF 2014, RDC announced an investment of \$1 million in ocean industries student research. Sixteen Memorial students from the Faculties of Engineering and Applied Science, Science, and Human Kinetics and Recreation, were recognized.



Memorial University announced the opening of the Craig L. Dobbin Genetics Research Centre.

THE FACULTY OF MEDICINE celebrated the official opening of the Medical Education Centre (MEC) in the fall of 2014, and the Craig L. Dobbin Genetics Research Centre in spring 2015. The entire development constitutes a new six-story expansion for the Faculty of Medicine. The MEC is located on the first two floors of the expansion building and includes a state-of-the-art simulation lab; the Craig L. Dobbin Genetics Research Centre is located on levels three, four and five (with space on level six shelled for future research) and includes both a wet and dry lab and the genetics research centre. The openings represent an investment of \$22 million from the Government of Newfoundland and Labrador for the MEC; and \$17.9 million from the provincial government and \$11.2 million from the Canadian Foundation for Innovation (CFI) for the genetics research centre.

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MEMORIAL UNIVERSITY OF NEWFOUNDLAND | ST. JOHN'S | NEWFOUNDLAND AND LABRADOR | A1C 5S7 | CANADA

T 709 864 2530 | F 709 864 2559 | research@mun.ca | www.mun.ca/research