Memorial University's Research Magazine Winter 2013

research MATTERS

Large-scale project on small-scale fisheries

Psychology unit going to the dogs

Generating research in Labrador

***Dare to* Campaign invests in research funding growth**

MEMORIAL UNIVERSITY

Letter from the vice-president (research)

In the last issue of Research Matters, we proudly introduced Memorial's new Research Strategy Framework. Developed through extensive consultations across the University and the Province, the Framework presents our collective vision for research—one founded on the freedom to pursue, but also the achievement of, research excellence across all disciplines and themes. To this end, it pushes us to pursue, support and celebrate excellence in all its forms, and to ensure the appropriate and timely translation of research results.

One of the important outcomes of the consultation process was the identification of ten cross-cutting research themes. Spanning the continuum of discovery to applied research, and comprising creative activity and scholarship, each theme embraces Memorial's underlying mission to undertake research that responds to local need/opportunity but with global relevance and importance.

These strategic research themes are neither exclusive nor prescriptive in scope. To illustrate this point, the stories featured in this and future issues of *Research Matters* include icons denoting each theme to which the project is aligned. Some stories span multiple themes. Others are more clearly aligned with a single theme.

And some have no clear alignment to any theme at all. This allowance reflects the fact that there will always be value in and the need for research that falls outside thematic areas, no matter how inclusive. One interesting example is the work of Dr. Carolyn Walsh. She is exploring canine social behaviour through a variety of projects. The photo above will reveal my particular interest in this project.

We hope you enjoy learning more about research at Memorial University and, as always, we appreciate receiving your feedback. You can send your comments to research@mun.ca.

Christopher Loomis, PhD

COVER PHOTO: Dr. Ratana Chuenpagdee is leading an international project focused on small-scale fisheries. Read more on pages 6-7.

inside

research MATTERS

Editor
Meaghan Whelan

Assistant editor
Patrick Tyler

Contributing writers
Laura Barron
Melanie Callahan
Rebecca Cohoe
Moira Finn
Kelly Foss
Sharon Gray
Janet Harron
Namoi Osborne
Meaghan Whelan
Laura Woodford

Graphic design
Helen Houston

Research Matters is published by the Division of Marketing and Communications for the Office of the Vice-President (Research), Memorial University of Newfoundland. Versions of some articles have previously been published in Memorial's *Gazette*.

Please address any comments or suggestions to Meaghan Whelan, editor, *Research Matters*, Office of the Vice-President (Research), Memorial University, St. John's NL, A1C 5S7, email: research@mun.ca or telephone: 709 864 4073.

Psychology unit going to **the dogs**

by Kelly Foss

WHY DO DOGS BEHAVE AS THEY DO? Almost no other species shares as much of their lives with us as dogs, but how much do we really know about them?

Dr. Carolyn Walsh, an assistant professor in the Department of Psychology, is a member of the Canine Research Unit (CRU) at Memorial University. She says their studies are changing the way scientists view dogs. The group's main work is focused on canine social behaviour, specifically how dogs communicate and interact with each other.

"In the '60s there had been some research on dogs, but then it seemed to fall into disfavour," said Dr. Walsh. "It was kind of an elitism, thinking that these were domesticated animals, so how could they be interesting to study? But that attitude is changing."

While some of their research involves testing dogs in their homes and yards, much of what the CRU does happens in local dog parks, recording hours of footage of dogs interacting.

One study looks at social hierarchies of dogs living in multi-dog homes. Dr. Walsh says in other species where animals form social hierarchies, scientists find a correlation between rank and the levels of certain hormones in the animal.

"Cortisol is a stress hormone and testosterone is a steroid hormone, and depending on the species, the ratio of cortisol and testosterone can be important," she explained. "There hasn't been any research like this done on dogs, so we thought we would look to see if there was a relationship between the levels of these hormones and how dogs behave with each other in the household."

Researchers visit the multi-dog homes and while owners fill out dog personality questionnaires, dogs are tested, by monitoring things like which dog comes to the door first to greet the "stranger" and who gets to a toy first. Videos of the dogs and saliva samples are also taken.

"What's really great is that we can do all of this hormonal work now in a non-invasive way," said Dr. Walsh. "We take a saliva sample, which most dogs tolerate very well. All they have to do is sit there and chew."

Students have also spent hours going through the dog park videos and coding different dog behaviours. They're even interested in finding out if there's a scientific reason why some dog owners treat their pets like children.

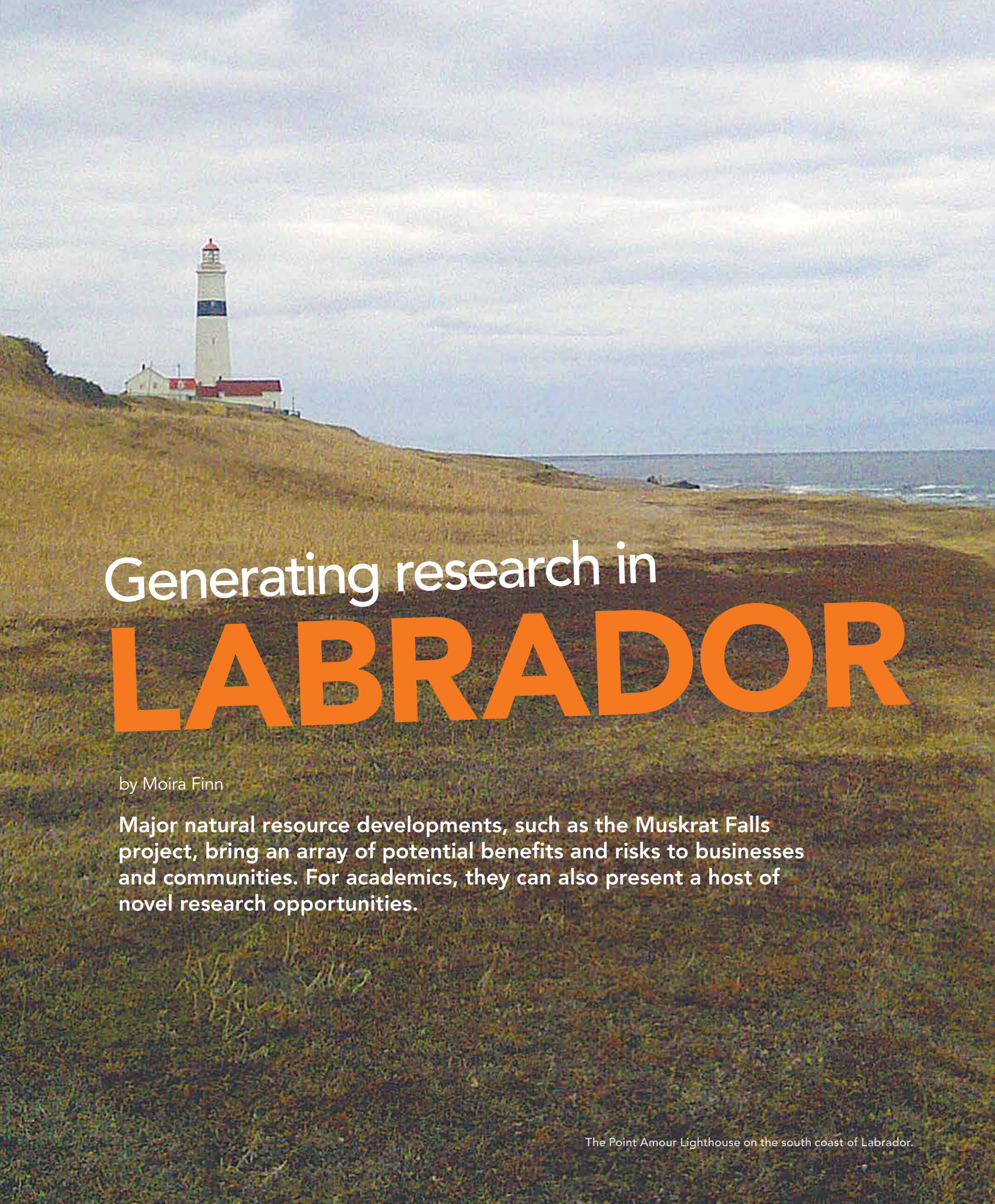
"One of our guesses is that humans are often so attached to their pets because we're probably using some of the same neurohormonal/neurobiological systems that we use with our children," said Dr. Walsh. "Oxytocin is the hormone implicated in social bonding, and we see it in mother/child interactions. We're the only ones using non-invasive saliva analysis to see if oxytocin is present in relationships between humans and dogs."

The group is also looking at the human perception of certain colours of dogs.

"One of the things we've heard about is an idea called black dog syndrome," explained Dr. Walsh. "A lot of shelter workers and breeders of dogs report that the black dogs and cats tend to get placed last. It suggests to us that maybe there's something in terms of how people perceive black animals. Our student is going to use video and photos to look at what factors influence people's perception of a dog's likeability."

She says a new project about to begin is with a student who is also a dog trainer. She is looking into a popular idea, which suggests dogs use behaviours which calm other dogs down.

Dog owners interested in finding out more about the research, or how to participate, can visit dogsbody.psych.mun.ca/cru. ■



Generating research in LABRADOR

by Moira Finn

Major natural resource developments, such as the Muskrat Falls project, bring an array of potential benefits and risks to businesses and communities. For academics, they can also present a host of novel research opportunities.

The Point Amour Lighthouse on the south coast of Labrador.

THE SOUTH COAST OF LABRADOR has a rich history, pristine landscape and a burgeoning tourism industry.

It is also the site where the Labrador-Island transmission link—connecting Muskrat Falls on the lower Churchill River in Labrador with the island of Newfoundland—crosses the Strait of Belle Isle.

The scope of the transmission project is without precedent in the region and its impacts uncertain. What is known is the area and its iconic features—including the Point Amour Lighthouse, the Red Bay National Historic Site and the salmon-rich Pinware River—are likely to be affected by the construction and operation of the power corridor. Equally, there are questions surrounding the capacity and funding of roads, ferries and other municipal services.

But the development could bring tremendous opportunity as well, especially for the many small enterprises that are the backbone of the region's economy.

By working together to build an understanding of the proposed Muskrat Falls development, municipalities, businesses and community groups in the Labrador Straits area hope to optimize the benefits and mitigate adverse outcomes for the region.

Leading the effort is the Labrador Straits Development Corporation, (LSDC) which recently submitted a comprehensive response to Nalcor's environmental impact statement—the document provided by the proponent to regulators, outlining what it estimates to be all the project's impacts.

LSDC sought the help of Dr. Tom Cooper, assistant professor in the Faculty of Business Administration and a specialist in strategic planning and risk management, to help in its environmental impact statement analysis and response, specifically in the areas of tourism and municipal infrastructure.

Dr. Cooper is active in public engagement in Labrador and elsewhere in Newfoundland, working with business groups and development agencies to enhance regional development and entrepreneurship. And while working with various stakeholders in the province is gratifying, it often proves inspiring as well, triggering new ideas for research and academic papers and providing meaningful, real-world examples that can bring business theory to life in the classroom.

"This is a large-scale industrial project on our doorstep and it affords ample opportunity to explore accepted business principles and practices," explained Dr. Cooper. "I greatly enjoyed working with business and community groups in southern Labrador and a number of research ideas have already come from this—the application of the precautionary principle in risk analysis, to name just one.

"Many other regions the world over can learn from the experiences of the Labrador Straits as it faces these new choices and challenges."

Based on input from stakeholders from around the region and with the help of Dr. Cooper's analysis, LSDC's response to the Muskrat Falls environmental impact statement highlighted concerns with potential lasting effects, including waste management from work camps, additional traffic on Highway 510 and pressure on the already-tight local labour market.

The process also revealed possible advantages for the region, such as additional telecommunications and wireless capacity that could enhance business, educational and even health-care services for the south coast of Labrador in the long-term.

The Straits economy and community has already benefited from the environmental impact statement response process, as the development agency is leveraging the groundwork and using it for strategic planning.

"We saw from the outset that our response to the environmental impact statement could be used as a planning tool," explained Barbara Marshall, LSDC executive director. "It has given us a chance to take a big- picture look at our current situation, to identify areas of concern and areas where there is greater potential. As a result, we have a framework in place that will help us to continue to work together effectively as a region on economic matters." ■

LARGE-SCALE PROJECT ON SMALL-SCALE FISHERIES

by Janet Harron

RATANA CHUENPAGDEE IS A BIG THINKER. As the Canada Research Chair in Natural Resource Sustainability and Community Development in the Department of Geography, she is deeply interested in the interconnectivity and interdependency between natural and human systems.

And that big thinking has lead to a big project.

Dr. Chuenpagdee is the project director for the six-year, $2.5 million SSHRC-funded project, Too Big to Ignore: Global Partnerships for Small-Scale Fisheries Research. It involves 15 partners including intergovernmental organizations, research and academic

An estimated 560 million people, or eight percent of the global population, directly or indirectly depend on fishing for a living, and more than 90 per cent of these people are involved in small-scale fisheries

institutions, environmental and non-governmental organizations and 62 researchers based in Canada and 26 other countries around the world. The project's inaugural meeting took place recently in St. John's.

"This is the first time a project of this scale has focused on small-scale fisheries and I'm very pleased we (Memorial University) are hosting the initiative, given the importance of small boat fisheries in the province," said Dr. Chuenpagdee. "Historically the majority of research and policy discourses about fisheries have been centered on the large-scale industrial fishing sector."

Dr. Chuenpagdee believes there is a lot to be learned from experiences across the globe.

"As coastal communities we share the same concerns —food security, wellbeing, ecosystem health, and social justice. We want to be able to influence policy and decision making that affects our livelihoods," explained Dr. Chuenpagdee who has been active in fisheries research since 1985.

"I come from a place (Thailand) where fisheries are dominated by small boats—so when I hear the word 'fisheries' I think about both sectors, not just one," said Dr. Chuenpagdee who explains that the needs and interests of this sector are often ignored in policy discussions. She goes on to say that one of the many challenges in small-scale fisheries is that they do not share the same characteristics worldwide. In other words, a small boat in one place might be considered quite large in another.

"But it is not just about the size or scale of the boat that matters at the end of the day—there are many more aspects of the small-scale fishing sector that need to be understood and considered in management and governance."

The Food and Agriculture Organizations of the United Nations (FAO) already collect fisheries information on the commercial sector from member states using the same template to report catches, values and the species caught. Dr. Chuenpagdee believes that something similar could be used to capture details about small-scale fisheries.

Worldwide, small-scale fisheries represent an occupation, a livelihood and a way of life.

"People say that one way of addressing food security is through large-scale fishing. But the fish caught by those industrial fleets doesn't always go to the people that need it," added Dr. Chuenpagdee. "If fish can be caught in local waters, by locally owned small-scale fishing boats and supplied directly to local communities throughout the world, no one goes hungry. If you remove the small-scale fisher, who is going to feed those people?"

Small-scale fisheries also deserve better governance, which Dr. Chuenpagdee says can be fostered through collaboration and active participation of all players, including state, market and civil society.

In addition to enhancing understanding of small-scale fisheries through their research, Dr. Chuenpagdee and her Too Big to Ignore colleagues hope to build a new generation of "transdisciplinary" scientists who will look at various aspects of the fisheries—ecological, social, historical and political dimensions—and incorporate them into their work.

"It's all just a start in terms of building on our knowledge and experience. The work is ongoing. I could have called it Too Big to End," laughed Dr. Chuenpagdee. ■

The Change Clinic

UNIVERSITY–COMMUNITY PARTNERSHIP BENEFITS YOUTH AND FAMILIES

PHOTO CREDIT: Lori Wareham-Mulrooney

by Laura Woodford

LONG WAIT LISTS for child and adolescent mental health services continue to be a major concern locally, nationally and internationally. Unfortunately, implementing a more responsive service and the associated research is a significant challenge for many public mental health settings. A new partnership between a researcher at Memorial's School of Social Work and the Janeway Family Centre (JFC), Mental Health and Addictions Program of Eastern Health is providing collaborative opportunities for knowledge exchange, program development, and evaluation.

When Dr. Heather Hair, assistant professor at Memorial's School of Social Work, came to Newfoundland and Labrador she sought out children's mental health organizations as potential community partners willing to consider service development ideas in exchange for research opportunities.

Dr. Hair found that partnership with the Eastern Health Janeway Family Centre.

The JFC receives approximately 850 referrals each year for children and adolescents challenged with emotional, social and behavioural problems, or psychiatric disorders. Services, provided by social workers and psychologists, include traditional individual and family counselling, a variety of psycho-educational groups, and education and consultation.

Following consultations between Dr. Hair and JFC management and practitioners, she facilitated the development of the Change Clinic—the first of its kind in Newfoundland and Labrador. In exchange, she was given the opportunity to design and implement an outcome evaluation of the pilot project.

"One of the biggest challenges to community organizations is to find the time and resources to enable their participation in research with outsiders," said Dr. Hair. "I'm really glad that I had ideas that the JFC found valuable and useful for improving their service delivery and that in return I was able to complete a research project that was beneficial to both of us."

The pilot project and outcome research, Where's Help When You Need it? Developing Responsive and Effective Brief Counselling Services for Children, Adolescents and Their Families, was published in the international, refereed journal, *Social Work in Mental Health*. Although the pilot project was located in Canada, the service ideas have transferable potential internationally.

The results of the study provided enough evidence to warrant expanding the service in Eastern Health.

"The Change Clinic has enabled the Mental Health and Addictions program to offer a timely brief intervention option to children, youth and families who are seeking outpatient mental health counselling," said Kim Baldwin, regional director, Community and Children's Services, Mental Health & Addictions Program, Eastern Health. "It has helped to improve access to service and reduce wait times considerably. Our positive experience to date has prompted us to extend the project at the Janeway Family Centre, expand it to one of our rural sites, and consider it for some of our adult services."

Dr. Hair continues to be active in developing the service, training practitioners, and providing on-going consultation. As principal investigator of the research team, Dr. Hair hopes to soon implement the next stage of research at the JFC—comparing traditional counselling with the Change Clinic service—in spite of a current lack of funding.

The Change Clinic is an exciting outcome of a public engagement relationship between Memorial and Eastern Health. It has proven once again just what is possible when communities work together to share knowledge and experience. ■

All members of the Change Clinic team, except Dr. Hair, are employees of Eastern Health Mental Health and Addictions Program.
Back row (standing l-r): Melissa Seymour, Gail Tucker, Wanda Miller-Wadden, Jim Oldford, Heather J. Hair, Rhonda Shortall.
Front row (sitting l-r): Lori Wareham-Mulrooney, Kim Jordan.

Protecting our oceans, one polymer at a time

by Jackey Locke

FROM THE MOMENT the first drop of oil is spilled in a marine environment, the potential for devastation is huge.

The speed and accuracy of the response is critical to minimize the harmful effects, and Memorial University researchers are doing their part to ensure our ocean resources are protected.

The chief investigators of the Microfluidic Sensor project are Drs. Christina Bottaro and Erika Merschrod of the Faculty of Science's Department of Chemistry, and Dr. Kelly Hawboldt of the Faculty of Engineering and Applied Science. This project aims to develop microfluidic sensor technology to measure contaminants in harsh marine environments, especially oil-in-water. The core technology involved is molecularly imprinted polymers (MIPs) and accompanying sensing systems which can be deployed for oil spill monitoring and fate analysis, or incorporated into the online analysis of produced water and tracking of oil spills in the marine environment.

"Unlike the bulk of online systems or oil-spill tracking systems, we are targeting components of the oil that are most problematic in the environment due to their toxicity and/or persistence, which means they don't readily biodegrade and bioaccumulate in animals and plants," explained Dr. Hawboldt.

The primary advantage of the small MIP-based devices is their sensitivity and selectivity. When deployed into a marine environment, the MIPs will only detect targeted compounds, such as phenols, heavier polycyclic aromatic hydrocarbons and other compounds that are toxic to the marine environment, while avoiding irrelevant compounds, ensuring accuracy.

"That way produced water treatment or oil spill response systems can be tailored to focus on the contaminants of concern. Since the sensors are small and simple, they can be used anywhere samples need to be collected, and they can function in cold temperatures and under ice cover," said Dr. Hawboldt.

Drs. Christina Bottaro, Kelly Hawboldt and Erika Merschrod are measuring contaminants in harsh marine environments, especially oil-in-water.

The long-term goal is to use the platform technology for the commercialization of new biosensor applications in medicine, biotechnology and civil defense.

For Dr. Hawboldt, the most exciting part of all of this is being at the front end and in a position to prevent the negative impacts before they occur.

"This funding will not only lead to innovative sensors, but also delineate the contaminants of concern in produced water and oil spills. We will be better able to treat and respond to these events. This is especially true in harsh environments where compounds may disperse quickly, and therefore are difficult to measure, but still have an impact on the marine environment. In detecting these compounds, we will be able to better assess the environmental impacts and address them through treatment and mitigation," she said.

This project, with a total estimated cost of $3 million, received approximately $2.1 million from the Atlantic Canada Opportunities Agency's Atlantic Innovation Fund. This funding supports advancements in Newfoundland and Labrador's ocean technology cluster, IT industry and medical research fields. ■

DARE TO CAMPAIGN INVESTS IN RESEARCH

by Laura Barron

> "Memorial University is an institution of opportunity—now, more than ever before."

AS OF AUGUST 12, more than $62.8 million has been committed to *Dare To: The Campaign for Memorial University*. *Dare To* is the most ambitious private-sector fundraising campaign in the province's history. The campaign is set to close in early 2013, with a full update to be provided at that time.

The campaign's $50 million goal was announced in November 2011. Since the campaign launched, alumni, friends, small businesses, corporations and foundations have supported the campaign. *Dare To* has also been supported, from its very beginning stages, by Memorial's faculty, students, staff and retirees, who have contributed over $1.2 million.

Campaign priorities include major investment in student support and academic excellence, including: undergraduate and graduate scholarships and bursaries; research chairs and post-doctoral fellowships; and improvements to the university's facilities. These strategic investments will help to further distinguish Memorial as a world-class learning and research environment.

As a result of *Dare To*, Memorial will establish eight new research chairs and two new post-doctoral fellowships as well as other academic supports; and significant direct funding for research in a variety of key areas. The chairs will be housed within various faculties throughout the university, from the Faculty of Arts, to the Faculty of Engineering and Applied Science, to the Faculty of Medicine, and more, and include the Chevron Research Chair in Petroleum Reservoir Characterization, the Stephen Jarislowsky Chair in Culture Change in Rapidly Developing Modern Societies, the Statoil Chair in Reservoir Engineering and others to be announced. Two post-doctoral fellowships are endowed in the Faculty of Medicine and the fellows will conduct research within the new Craig L. Dobbin Genetics Research Centre.

"Memorial University is an institution of opportunity—now, more than ever before," said Dr. Christopher Loomis, vice-president (research). "These significant investments will strengthen our research and will support us in seeking answers to questions important to this province and the world."

Dare To is improving the university's capacity to support the people who make Memorial the diverse teaching, research and learning facility it is today. The impact of campaign investments will be seen for many years to come, through student success, research breakthroughs and improved facilities.

For more information, please visit dareto.ca. ■

CAMPAIGN ANNOUNCEMENT

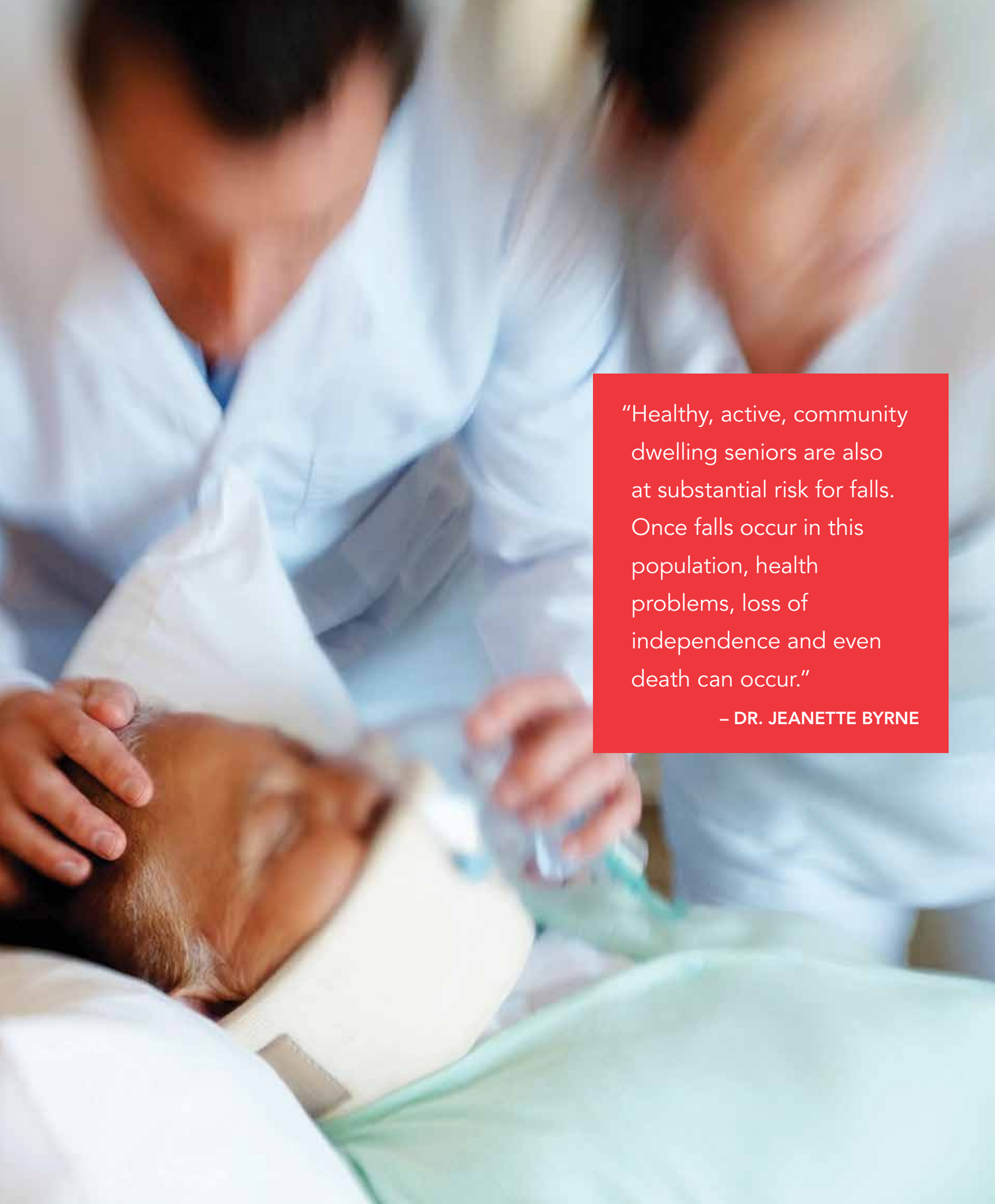
General Rick Hillier (Ret'd), chancellor and campaign chair, thanks campaign donors at a campaign update event in August 2012.

GENETICS CENTRE ANNOUNCEMENT

Dr. Gary Kachanoski, president and vice-chancellor (R), thanks Mrs. Elaine Dobbin (L) as he unveils an artist's rendering of the Craig L. Dobbin Genetics Research Centre within the expanded Faculty of Medicine.

STATOIL CHAIR ANNOUNCEMENT

(L-R) Keith Hutchings, minister responsible for the Research & Development Corporation, Hege Rogno, vice-president, offshore upstream, Statoil Canada, Mr. Glenn Janes, CEO, RDC, and Dr. Gary Kachanoski, president and vice-chancellor at a Statoil and RDC announcement in November 2011.



"Healthy, active, community dwelling seniors are also at substantial risk for falls. Once falls occur in this population, health problems, loss of independence and even death can occur."

– DR. JEANETTE BYRNE

HKR researcher hopes to help prevent the risk of falls by seniors

by Michelle Osmond

ACCORDING TO STATISTIC CANADA, 60 per cent of injuries in people over 65 are related to falls. In fact, the same report states that between 2000 and 2002, 4,110 Canadian deaths directly related to falls incurred by those over 65. Here in Newfoundland and Labrador, the Canadian Institute for Health Information confirms that fall-related hospitalizations due to hip fractures occur at a rate of 51 per cent, well above the national average of 39 per cent.

However, new funding from the Newfoundland and Labrador Healthy Aging Research Program may help reduce those statistics, at least in this province. Dr. Jeanette Byrne, from the School of Human Kinetics and Recreation, received $16,620 for her study, Fall Prevention in Seniors in the Greater St. John's Area: A Qualitative and Quantitative Examination of a Fall Prevention Program. With Dr. Michelle Ploughman from the Faculty of Medicine, she'll identify the beliefs and experiences of seniors when it comes to fall risk and fall prevention, and examine whether a 10-week exercise and education program will result in reduction in fall risk and subsequent fall incidence compared to education alone.

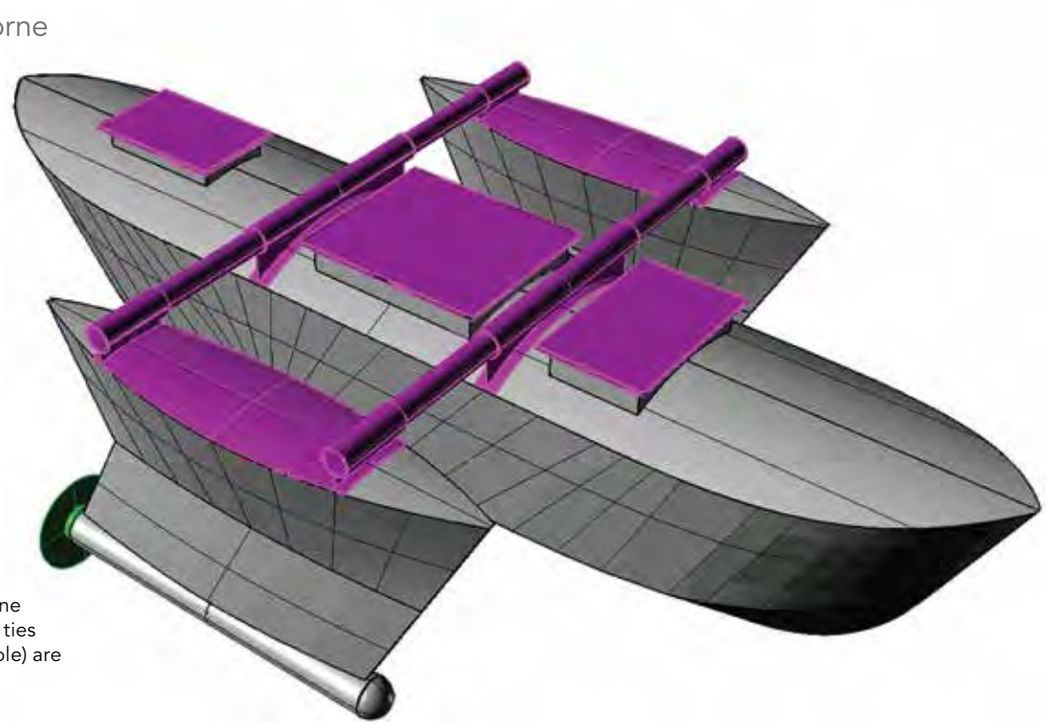
"Currently there are very few fall prevention initiatives in our province that target community dwelling seniors," explained Dr. Byrne. "Hospitals and long-term care facilities in the province have targeted programs aimed at reducing fall risk, however healthy, active, community dwelling seniors are also at substantial risk for falls. Once falls occur in this population, health problems, loss of independence and even death can occur. This research will help address this lack of attention played to fall prevention in the community and in the long term we hope it will lead to more permanent establishment of such programs throughout the province."

Drs. Byrne and Ploughman will work with two groups of 25 healthy, community dwelling seniors aged 65 – 85 years. Both groups will receive education sessions related to fall risk/prevention and one group will also take part in a 10-week exercise program. The researchers plan to share the results with the NLCAHR Affinity Group on Ageing and NL Injury Prevention Coalition, as well as with the Department of Health and health authorities.

The new Newfoundland and Labrador Healthy Aging Research Program funding is supporting four research projects in total at Memorial as well as the work of three graduate students. The provincial government awarded approximately $186,000 in the latest round of funding to facilitate a stronger focus on research on aging and seniors. The program is administered by the Newfoundland and Labrador Centre for Applied Health Research and was established to address the priority directions of the Provincial Government's Provincial Healthy Aging Policy Framework. ■

MI PRODUCES INNOVATIVE SHALLOW WATER MAPPING TECHNOLOGY

by Naomi Osborne



Vehicle concept design. Hull is made of fiberglass over marine grade plywood. Cross ties and hatch covers (purple) are of aluminum plate.

> "This vehicle will improve the competitive position of Newfoundland and Labrador businesses to capture emerging markets for new applications of swath sonar technology."
>
> **– BILL CARTER**

A SMART AUTONOMOUS SURFACE SURVEYOR vehicle, the first of its kind, has recently been launched by Memorial's Marine Institute's (MI) Centre for Applied Ocean Technology (CTec).

The surface surveyor was developed in response to the increasing demand for high resolution, seamless shore zone mapping and monitoring of coastal areas. This demand is increasing due to global warming (melting ice cover in the Arctic) giving way to new shallow and unchartered but navigable waters, rising sea levels, extreme weather events, storms and coastal inundation.

Designed to enable mapping in shallow waters, this vehicle is smart in the sense that it uses algorithms to fill in a predetermined area with data. It is also equipped with automated feedback loops which keep it on course and allow it to choose paths which are suitable for the underwater terrain along the survey route.

"This vehicle was designed and constructed in-house at MI by building on a prototype platform developed by our students," explained Randy Gillespie, director of CTec. "This effort has

accelerated, expanded and enhanced MI's applied research program in shallow water mapping."

The vehicle is fitted with a GeoSwath Plus phase measuring bathymetric sonar, contributed to the project by Kongsberg Maritime, which offers simultaneous swath bathymetry and side-scan seabed mapping. It also provides coverage of up to 12 times water depth and has very low power consumption.

Autonomous operation of the vehicle can be performed either by command from the vehicle mission control computer, or by using pre-set parameter files loaded prior to the mission. The software code used to navigate the vehicle was written by former MI Ocean Instrumentation student, Donovan Doucette.

"Having the opportunity to work on a project of this scope and magnitude was phenomenal. We had an excellent team and there was always someone to rely on," explained Mr. Doucette.

Since graduating this past spring, Mr. Doucette has been working as an electronics technologist at Oceans Limited, a Newfoundland company which carries out applied research and services in ocean research and weather forecasting/meteorology, where he works on acoustic material and develops software.

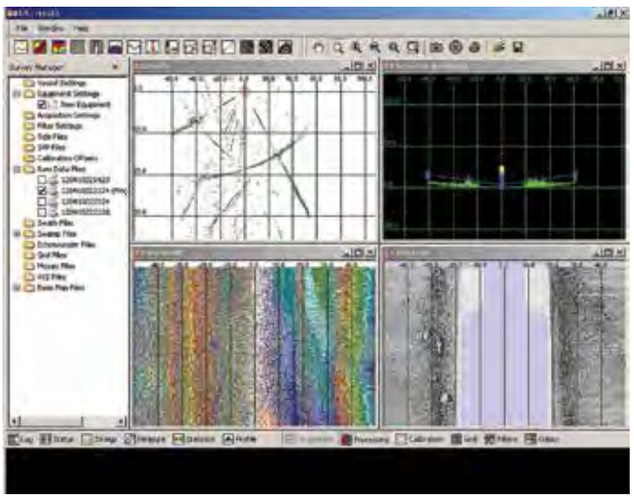
Inspired by this project, he went on to say, "My goal is to continue building my own sonar and to possibly build my own smaller version of a smart autonomous surface surveyor vehicle."

CTec is currently working in collaboration with MI's Centre for Fisheries Ecosystems Research on the possibility of using the surface surveyor for acoustic fisheries surveys offshore Newfoundland and Labrador.

"This vehicle will improve the competitive position of Newfoundland and Labrador businesses to capture emerging markets for new applications of swath sonar technology," said Bill Carter, assistant director, CTec. "The expertise that went into this effort from CTec will be transferrable to future Autonomous Underwater Vehicle (AUV), Remotely Operated Vehicle (ROV) and glider development initiatives." ■

Vehicle under construction, MI campus, Ridge Road.

Vehicle during initial field trials, Holyrood.



Screen grab of GeoSwath sonar system during initial field trials of vehicle. Upper right is signal strength (port/starboard); lower left is depth; lower right is sidescan (note boulders on left side of sidescan data).

Investigating the hidden mysteries of the skies

by Melanie Callahan

MEMORIAL'S GRENFELL CAMPUS in Corner Brook is home to the largest astronomical telescope in Atlantic Canada. Installed in the fall of 2011, it offers exciting new teaching and research opportunities to the Grenfell community.

The telescope, which was engineered by DFM Engineering in Colorado, has the capacity to gather up to 10,000 times more light than the human eye. It is fully computer controlled with tracking motors on an equatorial mount to compensate for the motion of the Earth, allowing it to maintain objects in its field of view. Within the dome a five-inch finder telescope and articulated relay eyepiece can accommodate the viewing public of all sizes and abilities.

The single most important aspect of the telescope is the imaging camera. At the heart of this detector is a charge-coupled device, or CCD, similar to those found in digital cameras. The CCD has revolutionized astronomy since its introduction in the late 1970s, and as a detector of light is far superior to the eye or the photographic plate. In addition, the CCD produces an image in digital form, which can be viewed, manipulated and measured with a computer.

"In short, the CCD camera allows this telescope to carry out projects that would only have been possible on a much larger instrument a few decades ago," explained Dr. Doug Forbes, professor of physics and observatory director.

A small solar telescope, piggybacked on the main telescope, allows safe viewing of the sun during the daytime. Sunspots and beautiful prominences along the sun's limb are revealed through the special solar filter.

Dr. Forbes said that while the telescope is mainly a teaching tool, it can and does have an important research role.

"Despite its modest size and location on campus, it is capable of high-quality, scientifically useful results," he said.

One area of research is the exploration of the variability of newly formed stars in open clusters. For a variety of reasons, many stars vary in light. The telescope is monitoring a number of young open star clusters to detect and observe these stars to determine the manner in which they vary.

Dr. Forbes and his team are also working to determine half-light diameters of open clusters, a group of up to a few thousand stars that were formed from the same giant molecular cloud and have roughly the same age. Grenfell Campus researchers are establishing an observational technique that would enable the telescope to obtain information about characteristics which would provide insight into the changes in the cluster over the course if its life. After accurate and reproducible results can be shown, plans are underway to conduct a survey of most of the clusters within the telescope's reach.

Through the observation of rotation curves for slowly-rotating asteroids, Dr. Forbes will determine the orientation of the asteroid's pole and, if possible, get a good idea of its shape. Many of the larger asteroids are already well studied, but there is a significant gap in our knowledge for some smaller asteroids. Dr. Forbes is hoping to fill this gap by working with partners including the Lowell Observatory in Arizona to observe the same object around the clock from different locations with each observatory handing over to the next one to the west as the night ends.

The telescope's research potential will also be realized by senior-level physics students in coming years.

"With the growth of the physics degree and the prospect of third-year astronomy courses as well as fourth-year research projects, there will be more opportunity for student-based research," said Dr. Forbes. "This will be less original, by necessity—students will observe transits by exoplanets already known to exist, rather than be detecting new ones—but it will give them a great hands-on introduction to how research is done."

In addition to teaching and research priorities, community outreach programs are also an important part of the telescope's mandate. Public tours and observing nights have been scheduled, and remote-observing programs for provincial schools, and astronomy and physics-themed "camps" for high school students are in the works.

"We are the only teaching or research telescope anywhere in Newfoundland and Labrador," said Dr. Forbes. "Observatories, especially ones with a strong public outreach component have a significant impact on getting people interested in science. One of the major drivers in getting a observatory here has been the effect we believe it will have in attracting young people to careers in science and technology, an important part of building a competitive knowledge-based economy." ■

Study shows birth by Caesarean section (C-section) may increase risk for Type 1 diabetes in children

by Sharon Gray

RESULTS OF A STUDY conducted by researchers in the Faculty of Medicine and the Newfoundland and Labrador Centre for Health Information (NLCHI) indicate that delivery by caesarean section is associated with childhood onset of Type 1 diabetes in Newfoundland and Labrador.

Dr. Leigh Anne Newhook, Discipline of Pediatrics in the Faculty of Medicine, teamed up with researchers Jennifer Phillips, Nicole Gill and Kohkan Sikdar from NLCHI, and Sharon Penney with the Janeway Pediatric Research Unit, to conduct this study, which was supported by a $30,000 Cox Award in 2009 from the Medical Research Endowment Fund (MRF). The results were published in the *Journal of Environmental and Public Health* in 2012.

Newfoundland and Labrador has one of the highest rates of Type 1 diabetes worldwide. Dr. Newhook said findings of this study indicate that birth by C-section was a significant risk factor for later development of childhood Type 1 diabetes. She said theories of why method of birth may be important include the role of early colonization of bacteria in the baby's gut acquired during the birthing process and early development of the immune system.

"Studies have shown a difference between the compositions of gut microbiota in vaginally delivered children and those delivered by C-section," Dr. Newhook explained. "Another possible explanation is related to the hygiene hypothesis which proposes that the risk of diabetes may be increased when children are not exposed to infections early in life—children delivered by C-section have decreased neonatal infections compared to children born vaginally."

Newfoundland and Labrador has a high rate of birth by C-section as compared to other regions in Canada. The provincial rate of births by C-section was 30.9 per cent in 2005-2006 versus the Canadian rate of 26.3 per cent. The rates of C-section have increased in NL to 33 per cent in 2010.

Birth weight and gestational age were not found to be associated with risk of Type 1 diabetes in this study.

Cases of diabetes were identified using the Newfoundland and Labrador Diabetes Database (NLDD) for childhood diabetes, maintained by the Janeway Pediatric Research Unit. This database contains data on cases of Type 1 diabetes in children diagnosed from 1987 to present.

The Live Birth System, an administrative database maintained by the Newfoundland and Labrador Centre for Health Information and containing data on all live births in Newfoundland and Labrador from 1992 to present, was used to obtain demographic data and clinical factors related to the risk factors of interest related to the pregnancy and birth.

Members of the Janeway Pediatric Diabetes Research Team have been studying the incidence of Type 1 diabetes in children in the province over the past two decades. Recently there has been an updated analysis on the population of children 0-14 years with Type 1 diabetes from Newfoundland and Labrador, confirming a very high and increasing incidence over a 24-year study period. The incidence from 1987 to 2010 was 37.7/100,000, one of the highest reported worldwide. The incidence from 2007-2010 was 49.9/100,000. The results from this research continue to show a very high and increasing incidence and there continues to be a male preponderance in the 0-4 age group.

Dr. Newhook said the team hopes to research the association of Type 1 diabetes and birth by C-section in greater detail to delineate if it is the mode of delivery that is important or other perinatal factors that led to C-section delivery. The team has been recently awarded a project grant from the Newfoundland and Labrador Centre for Applied Health Research to continue the research. ■

Newfoundland and Labrador has a high rate of birth by caesarean section and a very high and increasing incidence of Type 1 diabetes.

Dr. Yvan Rose, associate professor in the Department of Linguistics and 2006 Petro-Canada Young Innovator Award recipient.

Young Innovator Award leads to new approach for studying child language development

by Meaghan Whelan

CHILDREN PICK UP LANGUAGE with remarkable ease, yet errors in speech are common, such as a two-year-old saying "ba-ba" instead of "bottle". For researchers, understanding these errors in speech can lead to breakthroughs in the diagnosis and treatment of speech disorders.

Technology developed by a Petro-Canada Young Innovator Award recipient is changing the way these errors are studied and shedding new light on speech disorders.

To study child language acquisition, researchers study audio examples of toddlers speaking. They listen to rhythm and intonation and analyze errors in speech. Scanning through one data corpus to search for a single pronunciation pattern such as "ba-ba" for "bottle" used to take a week of full-time work in the laboratory.

In 2004, Dr. Yvan Rose, a linguist in the Faculty of Arts, had an idea to link linguistics with computer science. Honours students in the Faculty of Science co-supervised by Dr. Rose and Dr. Rod Byrne (Computer Science) collaborated to develop a preliminary version of Phon, a software program that allows researchers to systematically analyze speech patterns in child language development. Phon is an open-source database program with which researchers can compare acquisition and/or disordered speech data with typical adult speech, see quickly where discrepancies are occurring and explore possible causes.

After developing the proof-of-concept, Dr. Rose and his team knew they had a tool with enormous potential but needed funding to kick-start the project.

That funding came through an award for emerging young researchers sponsored by Petro-Canada (now a part of Suncor Energy).

Dr. Rose was awarded the Petro-Canada Young Innovator Award in 2006, a $25,000 prize that provided the necessary boost to develop the software. Since then, Dr. Rose has partnered with Dr. Brian MacWhinney at Carnegie Mellon University, one of the largest universities in the world for research on child language development. The duo are collaborating to extend the Child Language Data Exchange System (CHILDES) through the PhonBank Project, which involves an international consortium of linguists, psychologist and computer scientists focused on building a publicly available database documenting phonological development and speech disorders across languages. Drs. Rose and MacWhinney have received grants from the United States' National Institutes of Health for $2.5 million over two rounds of funding to further develop the public database and enhance Phon's capabilities.

The software allows researchers to see video of children speaking, hear their words and compute comparisons between what they were trying to say and how they actually said it. This makes it easier for researchers and practitioners to identify difficulties. Researchers can also upload data and run queries to compare results.

"Moving from the old method of manually searching through data to running a query in an electronic system is like moving from a magnifying glass to a microscope," explained Dr. Rose. "For example, my thesis had 6,000 examples. In a one hour presentation I gave last year, I used 22,000 examples. I was able to do in two weeks what would have previously taken four years."

The response from the scientific community has been overwhelmingly positive. Phon is now used by 96 researchers (and their students) in 26 countries—essentially anywhere that language development is studied. The database contains hundreds of thousands of examples in a variety of languages.

"Phon is an excellent example of innovation becoming standard in a field. I have no idea if this would have ever happened without the initial support provided by the Petro-Canada Young Innovator Award," said Dr. Rose.

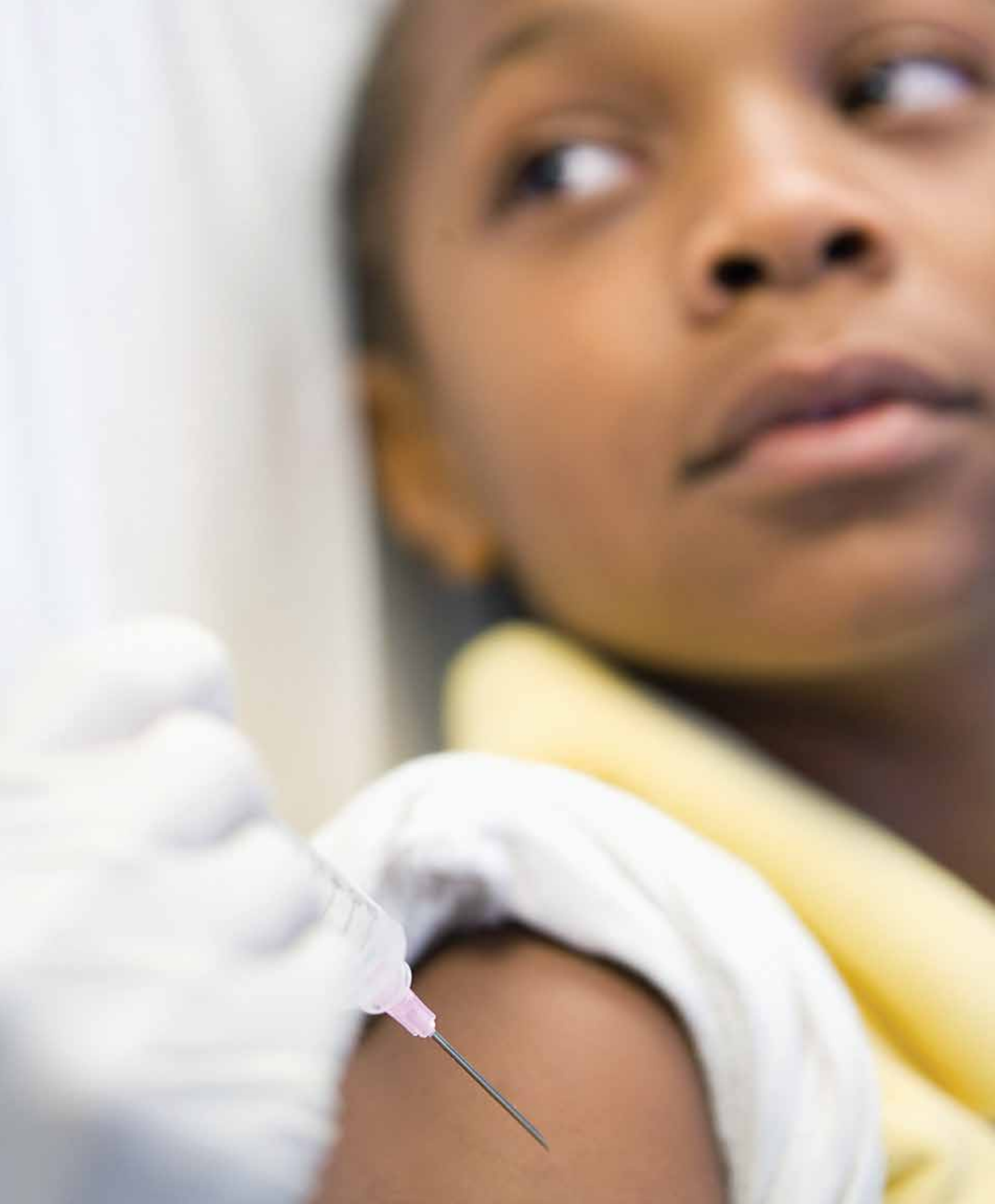
General interface of Phon.

"It's helping a lot of people. By studying the relationship between typical development and speech disorders with Phon, we are able to qualitatively and quantitatively see the differences. This can lead to earlier diagnosis, which can lead to better and more effective treatment."

The Phon software is now being used in fields other than child language acquisition. Researchers in the field of acoustic analysis are looking to Phon for transcription, data management and the ability to visually display acoustic values.

"Innovation is leading to innovation and now Phon is linking two major fields together. The Phon software is a great foundation for research in multiple linguistics disciplines that were previously unconnected," said Dr. Rose.

The Petro-Canada Young Innovator Award was created in 2005. After Petro-Canada merged with Suncor Energy in 2009, Suncor committed to continue their support for this award through the Terra Nova Development. The award was renamed in 2010 as the Terra Nova Young Innovator Award. It is awarded to outstanding and emerging researchers whose work has the potential to significantly impact society. ■



Memorial researcher travels to Haiti to reveal why many children drop out of vaccine programs

by Michelle Osmond

DESPITE ADVANCED STRATEGIES and national campaigns, many children in Haiti are not fully vaccinated.

Dr. Donna Moralejo and her team wanted to find out why.

Dr. Moralejo, a professor in the School of Nursing, is co-principal investigator on the project Determinants of Non-Vaccination of Children in the Nippes Region of Haiti. She collaborated with members of the Association de Santé Publique d'Haïti (ASPHA) and the Canadian Public Health Association. They documented and analyzed the causes of immunization drop-out in 20 districts of the Département Sanitaire des Nippes and, together with community leaders, identified strategies to improve the vaccination process. "The focus was not on providing clinical services but on capacity building and addressing one specific problem—how to increase vaccination coverage in one health department," noted Dr. Moralejo.

First, the research team surveyed 240 households (308 kids aged one to five years). What they found was that overall, 62 per cent of children were completely vaccinated. This varied by district however, with fewer than 50 per cent of children being completely vaccinated in 5 of 20 districts. Only three of the districts met the World Health Organization (WHO) target coverage rate of 80 per cent being completely vaccinated.

Surprisingly, even though about half of the participants in the survey lived more than a 30 minute walk from a health centre, physical access was not the most important reason for incomplete vaccination.

Mothers' knowledge and beliefs, and poor organization of health services were more important. Caregivers were also reluctant to subject their children to the side effects especially since acetaminophen is not readily available. Age, birth order (younger children, or those who were third or higher in birth order in larger families, were less likely to be completely vaccinated) and no postpartum consultation were contributing factors, as well.

The team then conducted focus groups with health-care workers, mothers and guardians, community leaders, and traditional practitioners. The focus groups identified possible strategies for reorganizing vaccination services, including going door-to-door, holding vaccination clinics in community locations such as the market, getting community members involved in campaigns, and training local workers just for vaccination services.

This project also aimed to strengthen the research capacity of ASPHA. "They now have research experience and are better prepared to fulfill their mission of organizing programs and activities based on local evidence," noted Dr. Moralejo. "ASPHA members have a tool kit that can be used as a template for similar types of studies, and they have experienced research assistants trained for data collection. And based on this project, they also have better communication and collaboration within and between departments and agencies."

This collaborative project with Haiti started in 2009 but ground work, which was supposed to begin in February 2010, was delayed until that October because of the earthquake in January of that year, elections and then the cholera epidemic. Dr. Moralejo and her team received nearly $100,000 from the Initiative in Global Health Research through the Canadian International Immunization Initiative for Haiti. It was Dr. Moralejo's second project in Haiti; the first was in 2002 related to the WHO's Stop Transmission of Polio program. ■

OF NOTE

Dr. Abdie Kazemipur fills Jarislowsky Chair

DR ABDIE KAZEMIPUR is settling into his role as the first Stephen Jarislowsky Chair in Culture Change in Rapidly Developing Modern Societies, housed in the Faculty of Arts.

A sociologist, Dr. Kazemipur comes to Memorial from the University of Lethbridge and is originally from Iran.

The mandate of the $2-million chair is to examine issues related to immigration and culture change. Dr. Kazemipur's current SSHRC-funded project, Pathway to Prosperity, focuses on immigration retention and integration in smaller Canadian cities.

"In smaller cities, immigrants tend to be part of a small minority group. They are therefore not easily assimilated and very visible. Essentially they don't have their own communities," explained Dr. Kazemipur. "What's wonderful about this opportunity is that we hope to address these issues before they happen."

Dr. Abdie Kazemipur, Stephen Jarislowsky Chair in Culture Change in Rapidly Developing Modern Societies.

Major award for vice-president (research)

DR. CHRISTOPHER LOOMIS, Memorial's vice-president (research), received one of the highest scholarly honours in Canada when he was inducted as a fellow of the Canadian Academy of Health Sciences (CAHS) in Ottawa, Ont., on Sept. 20.

This distinction is awarded to those with a history of outstanding performance in academic health sciences. Fellows are selected through a competitive peer-review process based on a demonstrated record of leadership, excellence and commitment to advancing the field.

Dr. Loomis was recognized for his accomplishments as a dedicated researcher, academic leader and teacher.

Dr. Christopher Loomis, vice-president (research), Memorial University (at right), is formally inducted as a fellow of the Canadian Academy of Health Sciences by Dr. Thomas Morrie, president of the academy.

Fall funding announcements

THE FALL 2012 SEMESTER brought a flurry of funding announcements for Memorial. Overall, more than $21 million was awarded in support of a variety of research projects.

Dr. Gary Kachanoski, president and vice-chancellor, speaks at a press conference to announce RDC's $5.3 million investment in a variety of research and development projects.

- The Research & Development Corporation (RDC) of Newfoundland and Labrador announced more than $5.3 million for a variety of research projects. Thirty-four researchers from the Faculties of Science, Engineering and Applied Science, Medicine, School of Music, Grenfell Campus and C-CORE received support. The RDC funding will leverage more than $16.9 million from other research sponsors.

- The Hibernia Management and Development Company Ltd. (HMDC) announced $11.8 million dollars in laboratory equipment and research for enhanced oil recovery. The project, led by Dr. Lesley James, may hold the key to producing additional oil offshore Newfoundland and Labrador.

- The federal government, through the Social Sciences and Humanities Research Council (SSHRC), invested more than $2.4 million in research projects in the Faculties of Arts, Business and Education.

- The Canada Foundation for Innovation invested $825,000 to help attract and retain top researchers. Nine researchers from the Grenfell Campus as well as the Faculties of Arts, Engineering & Applied Science, Science and Medicine received funding. The overall value of these research projects is more than $2 million.

- The Atlantic Canada Opportunities Agency, the provincial government and Husky Energy joined together to support a new initiative aimed at building capacity in applied economics research. The combined investment of $685,000 will create the Collaborative Applied Research in Economics (CARE) consortium.

- The government of Newfoundland and Labrador announced significant funding support for development of new core science infrastructure on Memorial's St. John's campus. In addition to high-end facilities for the Faculty of Science, the core sciences infrastructure plan includes additional growth for the Faculty and Engineering and Applied Science.

- Twenty-one Memorial students received a significant boost to their ocean-related research projects, thanks to the Research & Development Corporation's (RDC) 2012 Ocean Industries Student Research Awards. Six doctoral, 12 master and three undergraduate students—as well as their research supervisors—received a total of $866,333 towards their research projects.

30th anniversary of the Dictionary of Newfoundland English

THE DICTIONARY OF NEWFOUNDLAND ENGLISH, the life's work of editors George M. Story, William J. Kirwan and John Widdowson celebrated its 30th anniversary in 2012 with a symposium focused on past, present and future research on Newfoundland and Labrador English.

Culled from a vast reading of books, newspapers and magazines, and from extensive interviews, the Dictionary of Newfoundland English is one of the most important, comprehensive and thorough works about Newfoundland ever published. The continuing interest in Newfoundland English can be traced directly to the dictionary's role in documenting the richness of our language. See www.mun.ca/elrc for further details on the 30th anniversary celebrations.

MEMORIAL UNIVERSITY'S STRATEGIC RESEARCH THEMES

In Memorial's Research Strategy Framework, 10 strategic research themes were identified that represent areas of new research opportunity as well as existing areas of research strength.

Research within these themes span the research spectrum — from fundamental to applied research, including creative activity and scholarship. The strategic research themes also span geographies and in each theme, Memorial has research strengths in addressing provincial, national and international contexts.

Much of the research associated with the strategic research themes is not limited to any one theme; the inter-connectedness among them is a strong defining feature of research at Memorial. It is also important to note that there will be opportunities for researchers to address issues and opportunities outside these thematic areas.

ABORIGINAL PEOPLES
Research under this theme relates to the pre-history and history of Aboriginal peoples, as well as to contemporary issues and opportunities in Newfoundland and Labrador, nationally and internationally.

ARCTIC AND NORTHERN REGIONS
Research under this theme relates to people and communities, environment and resources, approaches and technologies for sustainable resource development, and land, ocean and coastal zones in arctic and northern regions.

COMMUNITY, REGIONAL AND ENTERPRISE DEVELOPMENT
Research under this theme relates to building capacity of people, organizations, communities, industries, and enterprises to foster social and economic prosperity and development in rural and urban communities, neighbourhoods and regions.

CREATIVE ARTS, CULTURE AND HERITAGE
Research related to creative production and expression; curation and interpretation; and archaeological, historical, ethnographic and archival research in Newfoundland and Labrador, Canada and internationally.

ENVIRONMENT, ENERGY AND NATURAL RESOURCES
Research related to the environment, development of natural resources (oil and gas, mining, forestry) and the interaction of people, industry and communities with the natural world, locally, nationally and globally.

GOVERNANCE AND PUBLIC POLICY

Research related to organizational and corporate governance, public policy and the relationships amongst governments and non-government organizations. Corporate governance consists of the collection of rules, processes, and practices that determine the relationship between managers of an organization and those who have a stake in the organization's performance, including shareholders, creditors, employees, customers, and society at large. Governance, more broadly, includes how government bodies develop and implement public policy, and how governments relate to non-governmental organizations in the shared allocation of decision-making and resources for achieving public policy purposes.

INFORMATION AND COMMUNICATION TECHNOLOGY

Research related to the theoretical foundations of information and communication technology (ICT), the design and deployment of ICT in a variety of settings, and the evaluation of the use of ICT and its impact on individuals, organizations, and society. It involves research into the study and design of systems that capture, store, transmit, process, and use information in a manner that is efficient, accurate, reliable, secure, profitable, and responsible.

OCEANS, FISHERIES AND AQUACULTURE

Research related to the maritime environment, the interaction of coastal people and communities with the ocean and maritime environment, and the scientific, technological and organizational requirements of industrial development in this environment, particularly relating to conditions in the North Atlantic. Fishery and aquaculture, more specifically, include fresh water and marine fish biology and environments and scientific, technological and organizational aspects of fishery and aquaculture industry development, and their related social, community, environmental and public policy characteristics.

SOCIAL JUSTICE

Research related to systems and structures that contribute to more humane, equitable and just societies. Its focus is on building the capacity and enabling the civic engagement of vulnerable populations, locally, nationally and internationally, whose voices are seldom heard in addressing the barriers to their wellbeing and full participation in society.

WELL-BEING, HEALTH AND BIOMEDICAL DISCOVERY

Research related to improvement of health and well-being through building research and knowledge provincially, nationally and internationally especially for the people of Newfoundland and Labrador in areas of unique provincial need and opportunity.

For more information about the Research Strategy Framework, including greater detail about the strategic research themes, visit www.mun.ca/research/framework.

Meet Memorial University.
The natural place where people and ideas **become.**

OUR STUDENTS – 21st-century explorers from more than 80 countries, 18,500 strong, intrepid and curious, ready to take risks and adventures to achieve their potential to become

OUR PEOPLE – engaging and committed faculty and staff, expert guides who facilitate exploration and experiential learning to help others become

OUR RESEARCH – spanning many disciplines, with faculty and students focused on expanding our understanding of our world and solving its problems, making ideas become

OUR ALUMNI – more than 75,000 seasoned explorers and problem solvers, inspirational exemplars of the transformational power of a Memorial University education

OUR CAMPUSES – four diverse learning and exploration environments uniquely shaped by our North Atlantic location and heritage, each offering the freedom to explore and experience the world

St. John's campus

Harlow campus, U.K.

Grenfell Campus, Corner Brook

Marine Institute campus, St. John's

MEMORIAL UNIVERSITY

Office of the Vice-President (Research) | Memorial University of Newfoundland | St. John's, NL A1C5S7 Canada | Phone 709 864 2530 | Fax: 709 864 2559 | research@mun.ca | www.mun.ca/research