IMAGINE

Baycrest

2010/11 BAYCREST
RESEARCH
ANNUAL REPORT

IMAGINE AGE WITHOUT AGING

DR. DONALD STUSS

Founding Director
Rotman Research Institute
Baycrest

DR. RANDY MCINTOSH

Vice-President of Research
Director, Rotman Research Institute
Baycrest

IMAGINE A DISCOVERY

THAT ENHANCES OUR BRAINS
AS WE AGE

THAT TREATS BRAIN INJURIES
FASTER THAN EVER BEFORE

THAT DETECTS AND PREVENTS
THE ONSET OF DEMENTIA

THAT ADVANCES SCIENCE INTO
THE FUTURE, TODAY

IMAGINE STARTING HERE

THIS IS THE NEXT GENERATION OF RESEARCH. THIS IS BAYCREST NOW.

WORLD-CLASS COGNITIVE NEUROSCIENCE
One of the top five brain institutes in the world, Baycrest's Rotman Research Institute is leading groundbreaking research in the field of cognitive neuroscience.

LAB TO MARKET
A dedicated technology transfer and commercialization incubator at Baycrest. Evidence-based technologies and interventions developed through the CBF aim to repair and rehabilitate function, and maintain brain health to prolong independent living.

BENCH TO BEDSIDE
Scientists at KLAERU integrate the cutting-edge cognitive neuroscience from Baycrest's Rotman Research Institute with multidisciplinary expertise. This important symbiotic relationship extends basic discovery from laboratory through clinical settings into the real-world environment.

IMAGINE THE NEXT GENERATION OF NEUROSCIENCE RESEARCH

To take an idea, test it experimentally, and then use that information to help people, to develop new therapies, to improve people's lives around the world — that's a dream for all scientists.

The difficulty is the slow pace of traditional knowledge translation pathways. At Baycrest, we plan to make that happen much faster, by building a knowledge translation pipeline dedicated to cognitive and mental health in aging. Elements of the entire research and knowledge translation continuum will be located at Baycrest – pure, applied, clinical and evaluative sciences – plus a dedicated technology transfer and commercialization incubator, the Centre for Brain Fitness.

Through major international collaborations, scientists at Baycrest's Rotman Research Institute (RRI) are driving research agendas around the world, in the interest of learning more about the human brain and how it changes, adapts and recovers over time. Baycrest scientists continue to make new discoveries in cognitive neuroscience and to develop new tools and techniques to apply this knowledge across a range of disciplines. With electroencephalography (EEG), magnetoencephalography (MEG), magnetic resonance imaging (MRI) and eye-tracking facilities devoted solely to research, as well as systems enabling the use of multiple imaging facilities simultaneously, the RRI is unique in Canada and one of a few such facilities in the world. This is the exceptional community that trains the next generation of scientists – "bridging" investigators – who understand the value of a strong theoretical base and also have the skills to link into patient care, practice or policy domains.

In 2011, Baycrest is embarking on a strategic reorganization that will transform the way scientific discovery impacts care. After more than 20 years at the cutting edge of cognitive neuroscience and aging research, we are undergoing a strategic expansion that will see clinical, evaluative and translational research programs built around our areas of greatest scientific strength: cognitive and mental health in aging.

We will not only lead the way in creating the best, most innovative knowledge about human brain function, we will lead the way in modeling how to make that knowledge impact care.

I look forward to an exciting journey.

DR. RANDY MCINTOSH
Vice-President of Research and Director,
Rotman Research Institute, Baycrest

Scan this QR code with your smart phone to see the vice-president's message.

ACCELERATING PROGRESS IN COGNITIVE NEUROSCIENCE

SCIENTISTS SEEK ANSWERS TO FUNDAMENTAL QUESTIONS ABOUT THE AGING BRAIN

Baycrest's Rotman Research Institute (RRI) is a premier international centre for its multidisciplinary approach to the study of human brain function.

The RRI is home to world-renowned researchers encompassing a broad spectrum of expertise – ranging from behavioural neurology to cognitive psychology to neuropharmacology. Our scientists continue their pioneering efforts to understand the mechanisms of memory and executive functions of the brain, both in normal aging and in the presence of neurological and psychiatric diseases. Through global collaborations and expertise in diagnostics, rehabilitation and state-of-the-art neuroimaging techniques, the RRI contributes vital knowledge, advancing care and our quality of life.

The Next Generation of Discovery at Baycrest

aims to transform the journey of aging through these unique research centres:

CENTRE FOR INTEGRATIVE BRAIN DYNAMICS (CIBD)

COMPUTATIONAL NEUROSCIENCE

The CIBD is a multimillion-dollar collaboration seeking to create the world's first virtual brain — an unprecedented technological advancement in the quest to understand and effectively guide cognitive rehabilitation.

TORONTO TRANS-GENERATIONAL BRAIN AND BODY CENTRE (TTBBC)

POPULATION NEUROSCIENCE

Scientists at the TTBBC are systematically studying how combinations of genes and environments influence our health over time, and how to improve outcomes for a number of common conditions, such as hypertension, diabetes, depression and cognitive decline.

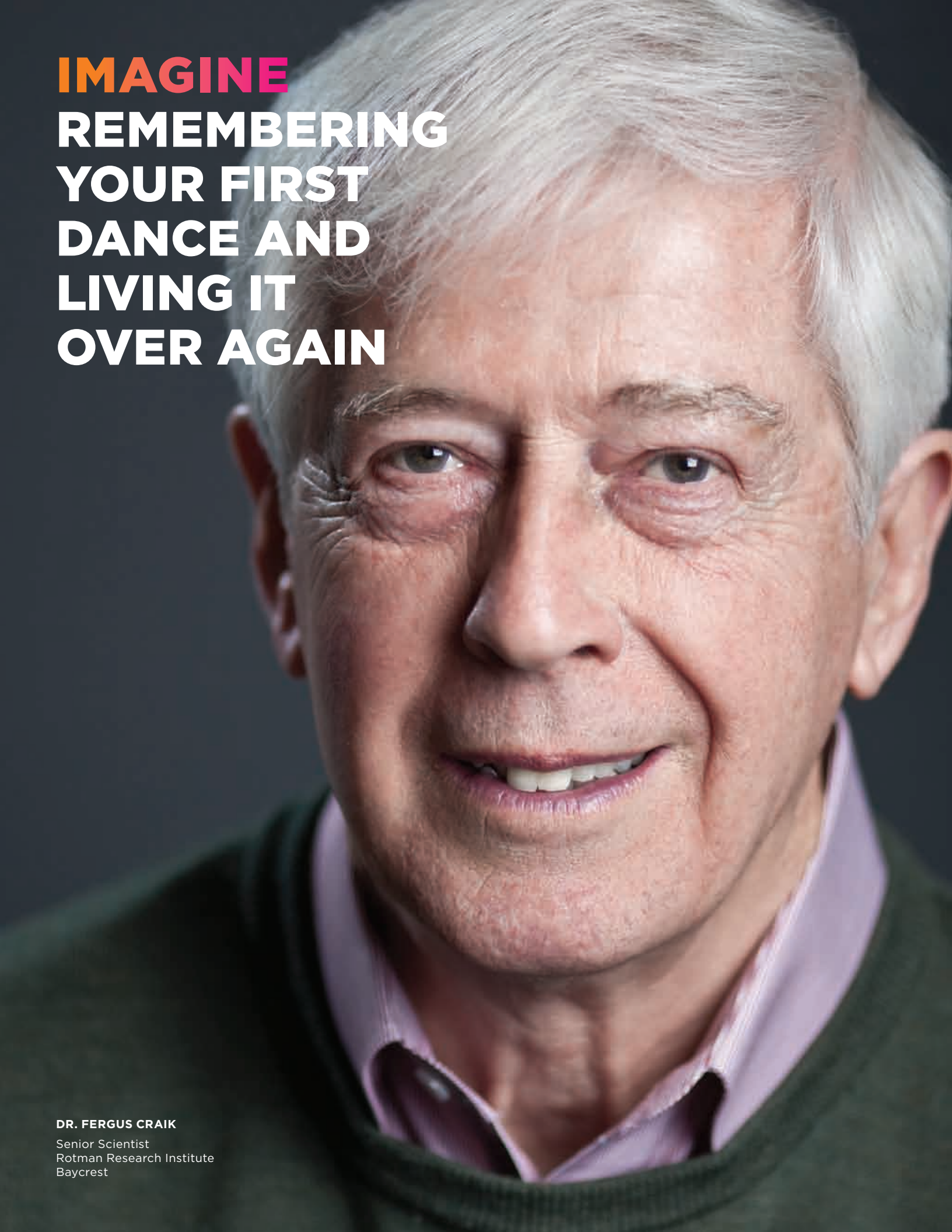
HEART AND STROKE FOUNDATION CENTRE FOR STROKE RECOVERY (HSFCSR)

COGNITIVE REHABILITATION

The HSFCSR is a research collaboration that aims to devise and test novel post-stroke interventions and therapies. One of three founding institutions, Baycrest brings its expertise in cognitive rehabilitation to this highly successful provincial initiative.

IMAGINE

REMEMBERING YOUR FIRST DANCE AND LIVING IT OVER AGAIN



DR. FERGUS CRAIK
Senior Scientist
Rotman Research Institute
Baycrest

IMAGINE RECALLING YOUR BABY'S FIRST LAUGH, 80 YEARS LATER

DR. BRADLEY BUCHSBAUM
Scientist
Rotman Research Institute
Baycrest

BEST AND BRIGHTEST

YOUNG SCIENTISTS AT BAYCREST WORK ALONGSIDE NEUROSCIENCE PIONEERS

Dr. Bradley Buchsbaum

THE WORLD WAS a different place when Baycrest's Rotman Research Institute (RRI) was born in 1989. Scientists were slowly uncovering the connections between aging and memory loss and between the brain and behaviour. Predictions about the effects of Canada's approaching "grey tsunami" were just emerging.

During those early years, the foundations of the Institute were laid by an extraordinary cadre of scientists: Dr. Fergus Craik, Dr. Morris Moscovitch, Dr. Donald Stuss, Dr. Endel Tulving and Dr. Gordon Winocur. Their seminal research into cognitive functioning and their exceptional leadership skills would launch the fledgling Institute into prominence over the next two decades.

Before long, their success began attracting to the RRI the best and the brightest young researchers from across Canada and around the world. Eventually, these young scientists would build on this foundation and begin striking out in new directions of their own.

In 2010, Dr. Craik – now a senior scientist at the RRI and professor emeritus of Psychology at the University of Toronto – continued studying various aspects of human memory and attention and how they change over time.

Today, he and Dr. Bradley Buchsbaum are using the RRI's functional magnetic resonance imaging (fMRI) equipment to study which parts of the brain are most involved in associative memory – for example, the ability to recall a name when one sees a face. This type of memory tends to get worse with age.

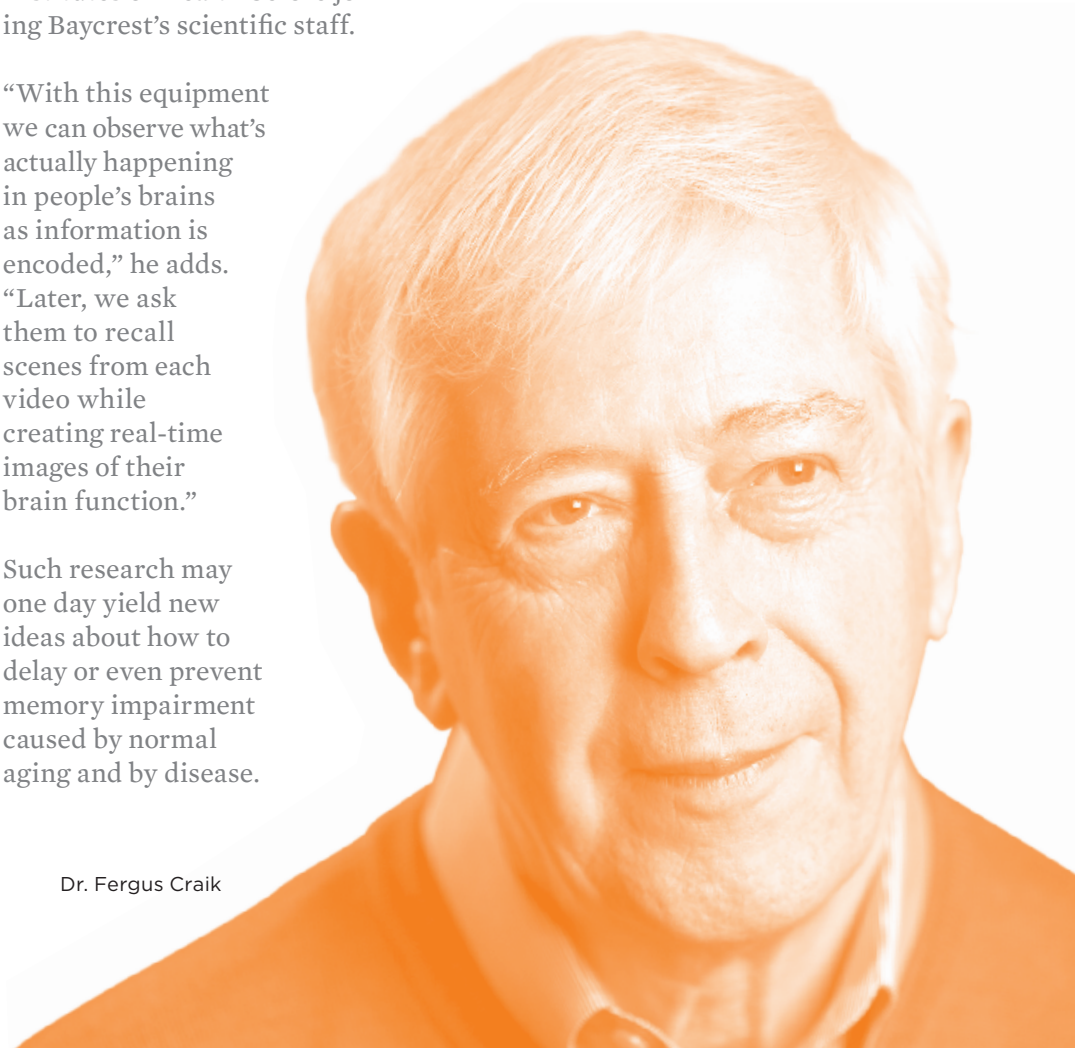
"We're hooking people up to the fMRI equipment and showing them vivid videos containing lots of complex information," explains Dr. Buchsbaum, who studied at the University of California and worked at the U.S. National Institutes of Health before joining Baycrest's scientific staff.

"With this equipment we can observe what's actually happening in people's brains as information is encoded," he adds. "Later, we ask them to recall scenes from each video while creating real-time images of their brain function."

Such research may one day yield new ideas about how to delay or even prevent memory impairment caused by normal aging and by disease.

As one of the RRI's founding scientists, Dr. Craik says that he especially enjoys working with up-and-coming young cognitive researchers like Dr. Buchsbaum, who is now in his second year at RRI.

As for Dr. Buchsbaum, he says he never thought he'd have the chance to work so closely with scientists whose names loom so large in the field. "For a cognitive neuroscientist, the Rotman Research Institute is definitely a very good place to be," he says.



Dr. Fergus Craik

STILL PUSHING BOUNDARIES

ENDEL TULVING, A RENOWNED PIONEER OF MEMORY RESEARCH

DR. ENDEL TULVING
Scientist Emeritus
Rotman Research Institute
Baycrest

THE YEAR 2010 MARKED the retirement from Baycrest's Rotman Research Institute (RRI) of a true giant in cognitive neuroscience: Dr. Endel Tulving, one of the first scientists to creatively consider and formally study human memory.

Dr. Tulving, who came to the RRI in 1992, says that when he began his work 60 years ago, experimental psychologists simply didn't deal with concepts such as memory. He theorized – and then was able to prove – that our brains contain multiple memory systems, and that it would be possible to investigate and identify the role each system plays in cognitive performance.

One of Dr. Tulving's best-known findings was the distinction between "episodic" and "semantic" memory. Semantic memory is the sum of all knowledge one has obtained – words, numbers, facts. Episodic memory refers to unique and concrete personal experiences.

Indeed, much of the research done by scientists at the RRI and elsewhere around the world rests firmly upon this foundation of imagination and knowledge.

Although he says he is no longer doing "active science," Dr. Tulving continues collaborating with others who are involved in cognitive research. One of his current interests is something he calls "mental time travel" – the ability of the human mind to look back and also to think ahead.

"A normal person can travel back in time and also think about what they will do tomorrow, and we take this for granted," he explains. "But many individuals with amnesia who do not remember their own past also cannot think about their own future. Thus, remembering the past and thinking about one's future seem to be closely related. This is such a deep mystery and miracle because there is no known physical basis for it yet, but there must be. It is impossible for anything to happen in the mind that doesn't happen in the brain."

Dr. Tulving – who is now 84 and admits to having the occasional memory lapse – reflects on the recent and rapid development of brain-accessing technologies like positron emission tomography (PET) and, more recently, functional magnetic resonance imaging (fMRI).

When he began thinking about memory in the 1950s, the brain was a closed system. The idea that scientists would one day be able to observe neural activity in such detail was in the realm of science fiction. "The growth of this technology and of the Rotman Research Institute itself that I've witnessed in the past few decades is absolutely astounding to me," he says.

IMAGINE A NEW SOURCE OF ENERGY – THE HUMAN BRAIN

DR. CAROL GREENWOOD
Interim Director and Senior Scientist
Kunin-Lunenfeld Applied and
Evaluative Research Unit
Baycrest

IMAGINE
UNDERSTANDING YOUR TEENAGER'S BRAIN

DR. NICOLE ANDERSON

Cognitive Rehabilitation Scientist
Kunin-Lunenfeld Applied and
Evaluative Research Unit
Baycrest

RESEARCHERS SEEK NEW WAYS

TO DELAY OR PREVENT COGNITIVE DECLINE

IT'S WELL KNOWN that what we eat can increase our risk for developing illnesses such as heart disease, high blood pressure and some kinds of cancer. Dr. Carol Greenwood and her colleagues have recently added cognitive decline to that list.

For more than a decade, Dr. Greenwood – interim director of Baycrest's Kunin-Lunenfeld Applied and Evaluative Research Unit (KLAERU) – has explored the impact of lifelong dietary patterns on the risk of cognitive decline with aging.

For example, she found that people over age 60 diagnosed with Type 2 diabetes (non-insulin dependent) showed brief decreases in cognitive function after eating. For the past four years, Dr. Greenwood has been collaborating with nutritional researchers in Quebec to learn more about what role obesity-related illnesses like Type 2 diabetes might play in the development of dementia.

"We've already made an association between food ingestion and brief cognitive decline," she says. "Now with the help of colleagues at the Rotman Research Institute, we're using brain imaging technology to more fully describe and understand this connection."

The ultimate goal is to understand the biological factors that connect diet to dementia and to identify food strategies that might minimize this decline. "We also hope our findings will help younger people – those now in their 40s and 50s – to start taking control of their diets and their weight so they might avoid cognitive decline later in life," she adds.

Meanwhile, another Baycrest scientist, Dr. Nicole Anderson, is looking at how specific interventions help healthy older adults, those with mild cognitive impairment, and people recovering from stroke. The goal is to understand why certain interventions work and then use that information to improve the intervention.

In 2010, she continued her work on the BRAVO study – a unique research project that is exploring the benefits of volunteering at Baycrest. BRAVO stands for "Baycrest Research About Volunteering among Older adults".

"Volunteering provides the opportunity for physical, cognitive and psychosocial activity," Dr. Anderson explains, "and research has demonstrated that it has a positive effect on brain fitness. This may serve as a buffer against the onset of dementia among those who take part in regular volunteer activities."

She and her colleagues want to learn whether specific volunteer placements and activities are more protective than others: that is, do volunteer positions that challenge people more confer greater protection?

Scan this QR code with your smart phone to learn how diet and nutrition can impact brain health.

Dr. Nicole Anderson

Dr. Carol Greenwood

DR. TOMÁŠ PAUS BRINGS WORLD-CLASS

EXPERTISE IN POPULATION NEUROSCIENCE TO BAYCREST

IN JANUARY 2010, Dr. Tomáš Paus, one of the world's leading experts on brain development, joined the scientific staff at Baycrest's Rotman Research Institute (RRI).

"Dr. Paus basically created the field of population neuroscience, where state-of-the-art neuro-imaging technology is used to understand the complex interaction between environment and genes that sculpt the healthy brain," explains Dr. Randy McIntosh, vice-president of Research at Baycrest and director of the Rotman Research Institute. "His work engages the community at large, giving them the opportunity to contribute directly to the research goals."

Dr. Paus, who is conducting large population-based studies in Canada and the United Kingdom, has been studying brain maturation and cognitive development from childhood to adolescence. Now working with Institute scientists, he is laying the foundation for a major research project based in Toronto that will span three generations – grandparents, parents and children.

DR. TOMÁŠ PAUS

"We want to understand how environmental and genetic factors shape the human brain and body," says Dr. Paus, who holds the joint Baycrest and University of Toronto Anne and Max Tanenbaum Chair in Population Neuroscience. He is also co-director – with The Hospital for Sick Children's Dr. Zdenka Pausova – of the Toronto Trans-Generational Brain and Body Centre located at Baycrest.

Dr. Paus and his team use state-of-the-art imaging tools like magnetic resonance imaging (MRI), to study brain structure and function. They then combine data obtained via these methods with detailed assessments of cognition and mental health, as well as cardiovascular and metabolic health, along with assessments of lifelong experiences and variations in genes.

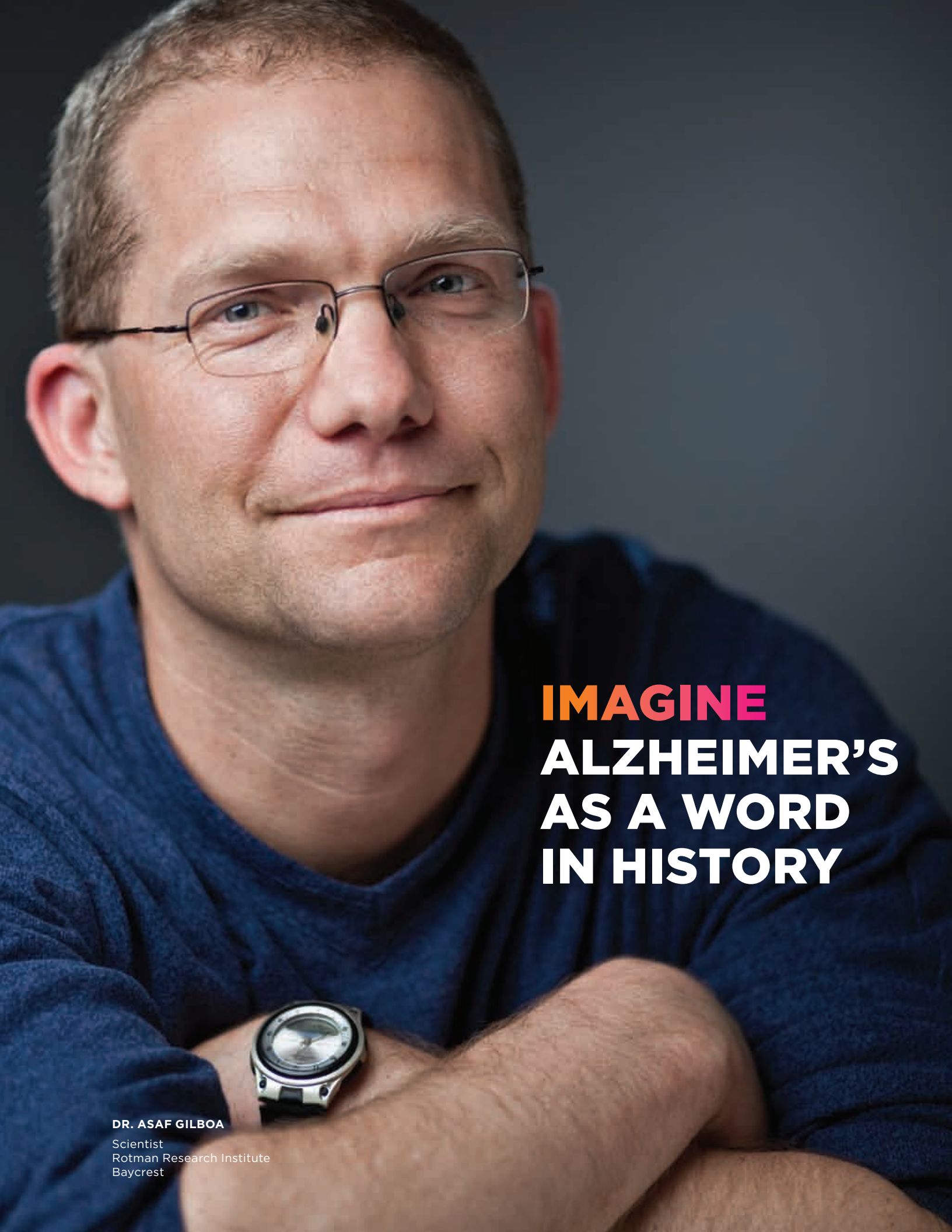
"The goal is to see how the environment combines with genetic traits to influence whether we develop disorders like depression, addiction, dementia, obesity and diabetes," Dr. Paus explains. "We hope our findings will be useful in helping convince people who might be headed down the path to illness later in life to embrace personalized interventions aimed at helping them stay healthier longer."

IMAGINE
HARNESSING THE BRAIN'S CAPACITY TO HEAL

DR. BRIAN LEVINE

Senior Scientist
Rotman Research Institute
Baycrest

Baycrest Site Director
Heart and Stroke Foundation
Centre for Stroke Recovery



IMAGINE ALZHEIMER'S AS A WORD IN HISTORY

DR. ASAF GILBOA
Scientist
Rotman Research Institute
Baycrest

BRAIN IMAGING TOOLS AND EXPERTISE YIELDING

NEW AND BETTER TREATMENTS

EACH YEAR, THOUSANDS of Canadians experience brain damage caused by traumatic injury, neurological illness or stroke. While many of the resulting cognitive deficits are obvious, others are quite subtle and can't be measured using current neurological examinations.

Dr. Brian Levine and his colleagues at Baycrest's Rotman Research Institute are hoping to close that gap. They are developing and using novel assessment and rehabilitation techniques, coupled with new brain imaging tools such as structural and functional magnetic resonance imaging (fMRI), electroencephalography (EEG) and magnetoencephalography (MEG), a non-invasive technology that measures the magnetic fields generated by brain activity.

"The depth of scientific expertise, combined with the availability of technology at Baycrest is allowing us to do more intricate research," says Dr. Levine, a senior scientist at the Institute and a professor in the Departments of Psychology and Medicine (Neurology) at the University of Toronto. "Besides gaining a better understanding of healthy and unhealthy brain function, our goal is to develop new and better interventions that will promote recovery and hasten rehabilitation."

Dr. Brian Levine

In 2010, Dr. Levine was engaged in two cognitive rehabilitation trials: one in patients with traumatic brain injury; the other involving people diagnosed with multiple sclerosis. A third trial, focused on patients affected by stroke, is starting.

"These conditions cause diffuse damage in the brain that we know interferes with connectivity and hinders executive functions – things like planning, staying on task and making decisions," he says. Dr. Levine and his team have developed and are testing specific short-term interventions designed to help people improve executive functions.

Stroke research at Baycrest is supported by the Heart and Stroke Foundation Centre for Stroke Recovery. In 2009, Dr. Levine was chosen to lead the Centre's Baycrest site.

While Dr. Levine's career at Baycrest spans 16 years so far, a new generation of stroke researchers is arriving. Dr. Asaf Gilboa, who joined the Institute in 2010, is currently working to develop new and better interventions for stroke rehabilitation based on a clearer understanding of how the brain acquires memories.

In collaboration with his Institute mentor, senior scientist Dr. Morris Moscovitch, and graduate student Tali Sharon at the University of Haifa in Israel, Dr. Gilboa is studying patients with amnesia – severe memory loss – caused by brain damage following heart attack or stroke.

"Using learning principles that children employ when they learn new information, we were able to induce learning in people with severe amnesia," explains Dr. Gilboa, who is also an assistant professor in the Department of Psychology at the University of Toronto. "We do this by encouraging the use of healthy parts of the brain instead of those that fail to work in these patients."

As a recent arrival, how would Dr. Gilboa describe the research opportunities he has found at Baycrest? "It's the best place for doing this kind of science," he says. "Not just because of technical resources, but because of the intellectual resources and the atmosphere of collaboration. That's what attracts and sustains us as scientists."

Dr. Asaf Gilboa

BAYCREST SCIENTISTS JOIN IN QUEST TO IMPROVE STROKE RECOVERY AND REHABILITATION

Stroke is the leading cause of adult neurological disability, the second leading cause of dementia and the third leading cause of death in North America.

Under the umbrella of the Heart and Stroke Foundation of Ontario (HSF), 19 core scientists at three centres — Baycrest, Sunnybrook Health Sciences Centre and the University of Ottawa/Ottawa Health Research Institute — are working on a variety of stroke-related research.

Scan this QR code with your smart phone to learn more about brain function and behaviour.

IMAGINE YOUR CIRCLE OF CARE, VIRTUALLY ANYWHERE

DR. ELSA MARZIALI

Senior Scientist
Kunin-Lunenfeld Applied and
Evaluative Research Unit
Baycrest

IMAGINE TECHNOLOGY DESIGNED FOR BRAIN RECOVERY AND REPAIR

DR. SYLVAIN MORENO

Scientist
Centre for Brain Fitness
Baycrest

APPLYING RESEARCH DISCOVERIES TO HELP PEOPLE COPE

WITH LATER-LIFE CHALLENGES

Dr. Elsa Marziali

WHILE BAYCREST scientists continue studying how the brain functions in health and in the presence of illness or injury, others, like Dr. Elsa Marziali and Dr. Sylvain Moreno, are applying this knowledge to help people in the real world.

Dr. Marziali, senior scientist at the Kunin-Lunenfeld Applied and Evaluative Research Unit (KLAERU), is currently evaluating Internet-based video-conferencing interventions for family caregivers and older adults with long-term disabilities and degenerative diseases, such as dementia, stroke and Parkinson's disease.

"We know from our studies that effective online support reduces caregiver stress and significantly reduces mental health problems," she explains. "This in turn prevents caregivers from becoming ill or overwhelmed and needing to use the health-care system themselves. Better health in caregivers may delay the need to place the chronically ill family member into a long-term care facility."

Dr. Marziali is also developing and evaluating a web-based program for older adults with chronic illnesses like heart disease and Type 2 diabetes and those affected by stroke who aren't following through with behaviours aimed at rehabilitation.

"The goal of the web-based program is to identify personal barriers to self-management of a chronic condition and to help people resume rehabilitation behaviours," she says. "The end result is helping them achieve an optimal level of well-being while living with an incurable disease."

While Dr. Marziali has been at Baycrest for more than a decade, Dr. Sylvain Moreno is among the newest hires. He did his post-doctoral research with adjunct Rotman Research Institute scientist Dr. Ellen Bialystock of York University in Toronto, and officially joined Baycrest as a scientist in January of 2011.

Dr. Moreno's main interest is in what scientists call "brain plasticity": the brain's ability to change (for better or worse) throughout life.

Dr. Sylvain Moreno

"There are many implications of this ability," he explains. "For example, we may be able to train the healthy brain in ways that boost cognitive reserve, so that age-related memory problems and dementing illnesses are delayed or prevented. This information may also help us design new and better cognitive rehabilitation programs."

Dr. Moreno is currently developing and testing "smart aging" training software for cognitive rehabilitation. His research shows that language, reading, and memory skills improve within months of using such software. He is also making use of the technology and expertise available at the Institute—from behavioural testing to functional magnetic resonance imaging (fMRI).

Dr. Moreno is the lead scientist at Baycrest's Centre for Brain Fitness which commercializes evidence-based technologies and interventions. The goal is to develop practical tools for the earlier detection and prevention of age-related memory decline, along with new options for cognitive rehabilitation.

Scan this QR code with your smart phone to learn how to cope with Alzheimer's.

THREE BAYCREST SCIENTISTS WHO PERSONIFY

EXCELLENCE IN RESEARCH

Baycrest is privileged to be the academic home for some of the greatest minds in cognitive neuroscience, according to Dr. William Reichman, president and chief executive officer of Baycrest. We present three of these high achievers:

DR. CHERYL GRADY

Senior Scientist, Rotman Research Institute, Baycrest
Canada Research Chair in Neurocognitive Aging, University of Toronto

In 2010, Dr. Cheryl Grady continued Baycrest's tradition of excellence in research. The main focus of her current work is "cognitive aging" — specifically, how aging affects brain activity during cognitive tasks and how these differences may affect behaviour.

Over the past 14 years, Dr. Grady's research has spanned many areas — from how our ability to recall faces changes with aging to how neural networks function across time. A recent interest is the variability of brain activity and how this is affected by aging.

"We hope our findings will allow us to design better methods of rehabilitation by identifying the brain mechanisms underlying behavioural difficulties in older adults," says Dr. Grady.

In 2010, one of Dr. Grady's papers, reporting on a project exploring large-scale brain network activity in older adults, won the Donald T. Stuss Award for Research Excellence.

DR. MORRIS MOSCOVITCH

Senior Scientist, Rotman Research Institute, Baycrest
Max and Gianna Glassman Chair in Neuropsychology and Aging, University of Toronto

When Dr. Morris Moscovitch first started doing research at Baycrest in the late 1980s, the Rotman Research Institute didn't exist. "The early days were challenging," he recalls. "But we had great leaders like Dr. Don Stuss and Dr. Morris Freedman who were eventually able to attract excellent scientists to join us. With the support of Joe Rotman and Baycrest, we soon had the feeling that we were actually leading the field."

Over the past 25 years, Dr. Moscovitch has built an impressive body of research in the areas of memory, attention and face recognition. He currently heads the University of Toronto's Human Neuropsychology and Cognitive Science Lab where scientists study neurologically normal people and those with brain damage related to stroke, head injury and Alzheimer's disease.

Dr. Moscovitch is known specifically for his work on the frontal lobes and a brain structure called the hippocampus which is likely involved in memory and attention. He currently sits on the editorial boards of prominent research journals including *Neuropsychologia, Cortex, Cognitive Neuropsychology,* and *Brain Research*.

DR. JENNIFER RYAN

Senior Scientist, Rotman Research Institute, Baycrest
Canada Research Chair in Cognitive Neuroscience of Memory, University of Toronto

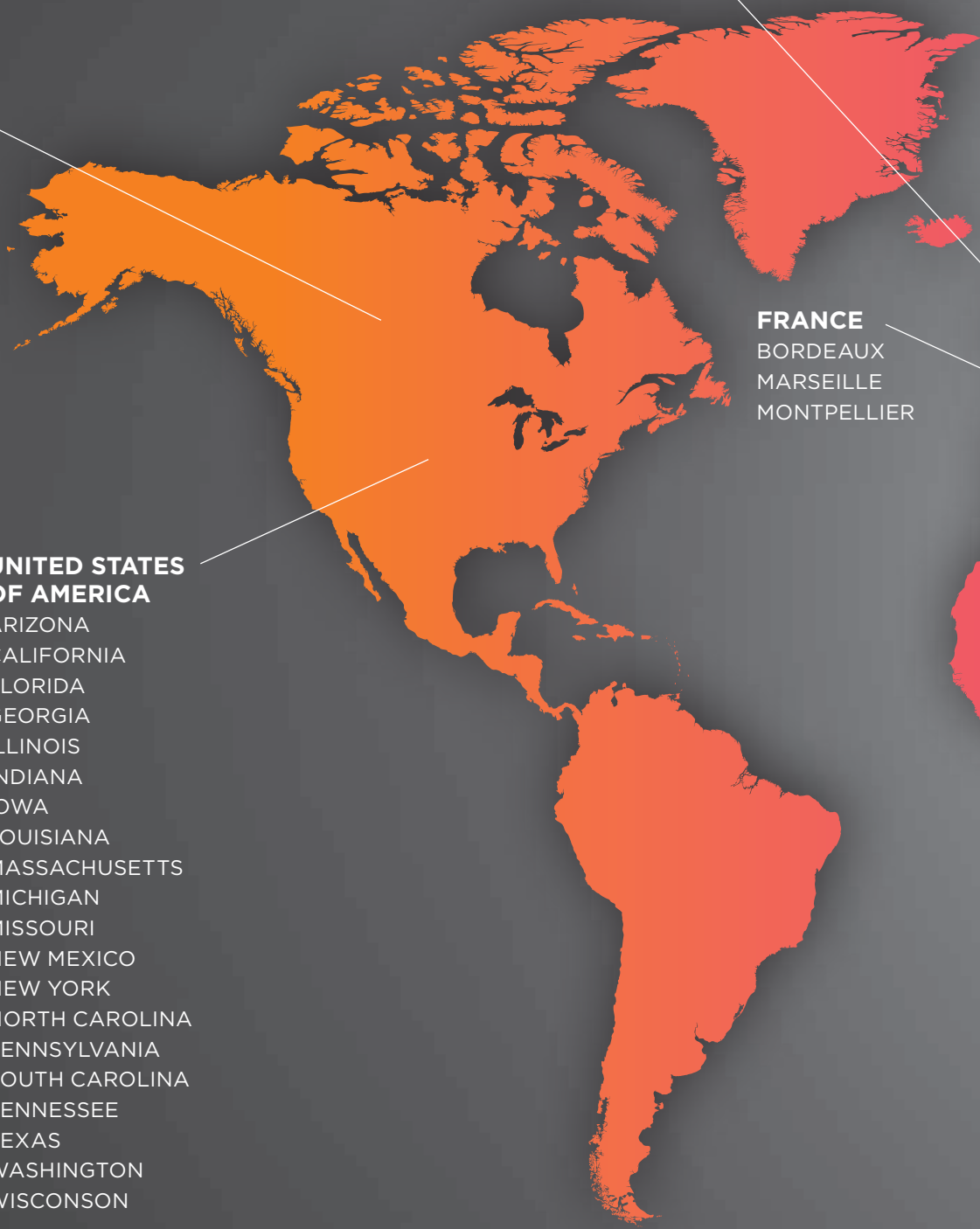
Dr. Jennifer Ryan is studying memory performance in younger and older adults, using specialized equipment to track eye movements. While others have studied eye movement to examine attention, Dr. Ryan believes she and her colleagues are the first to use it as a tool to explore memory.

"Eye-movement monitoring is based on the idea that our eyes are attracted to areas of the environment that have changed," she explains. "This allows us to look at which regions of the brain are 'on' while the subject is asked to think about or remember something. We can then associate different kinds of memory and certain areas of the brain."

Studying how memory systems break down may improve our understanding of how memory is organized more generally and lead to better methods for helping people with memory deficits due to aging, injury and illnesses, she explains.

GLOBAL COLLABORATIONS

THIS MAP SHOWS THE RANGE OF GLOBAL RESEARCH COLLABORATIONS OF OUR SCIENTISTS DURING 2010.



CANADA

ALBERTA
CALGARY

BRITISH COLUMBIA
BURNABY
SURREY
VANCOUVER

MANITOBA
WINNIPEG

NOVA SCOTIA
HALIFAX

ONTARIO
HAMILTON
KINGSTON
LONDON
OTTAWA
ST. CATHARINES
TORONTO
WATERLOO
WINDSOR

QUEBEC
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LACHINE
MONTRÉAL
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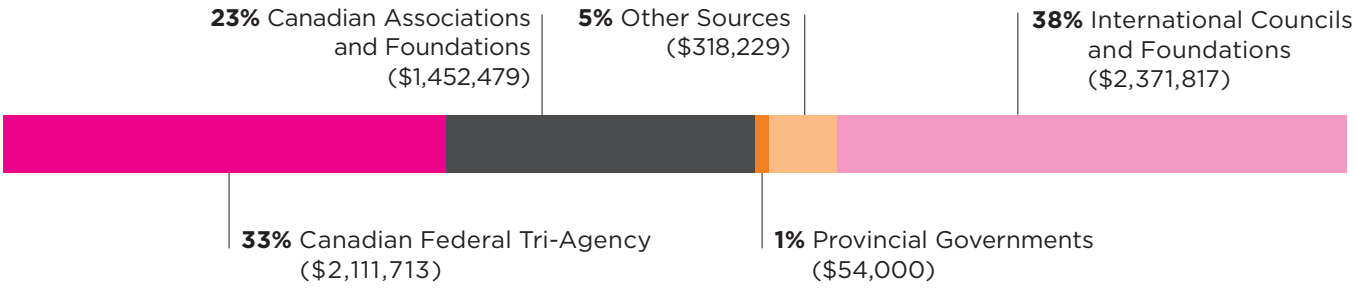
ISRAEL
TEL AVIV
HUNGARY
BUDAPEST

FINANCIAL AND PRODUCTIVITY INDICIES

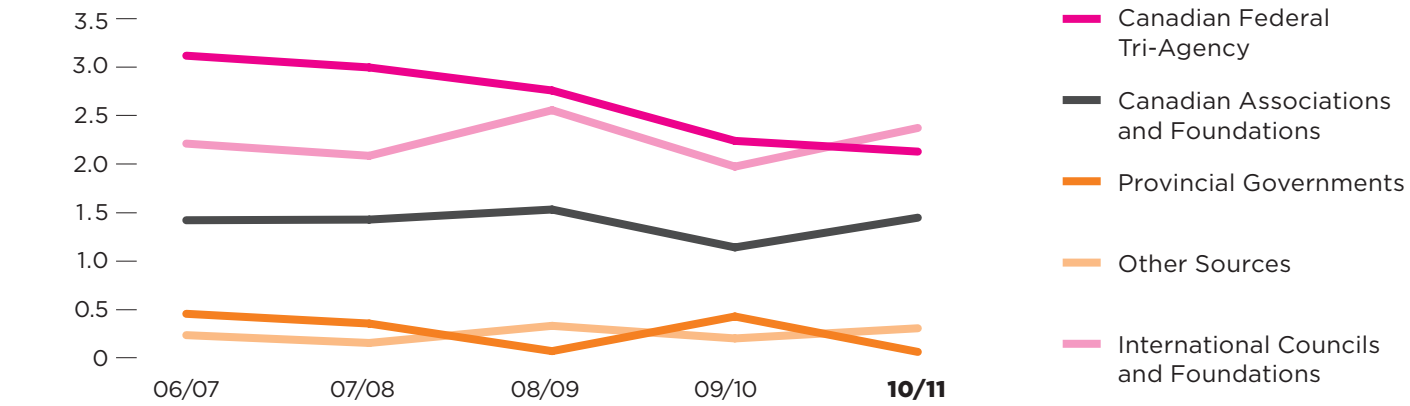
YEAR ENDED MARCH 31, 2011

RESEARCH PEER-REVIEWED REVENUES BY SOURCE 2010-11

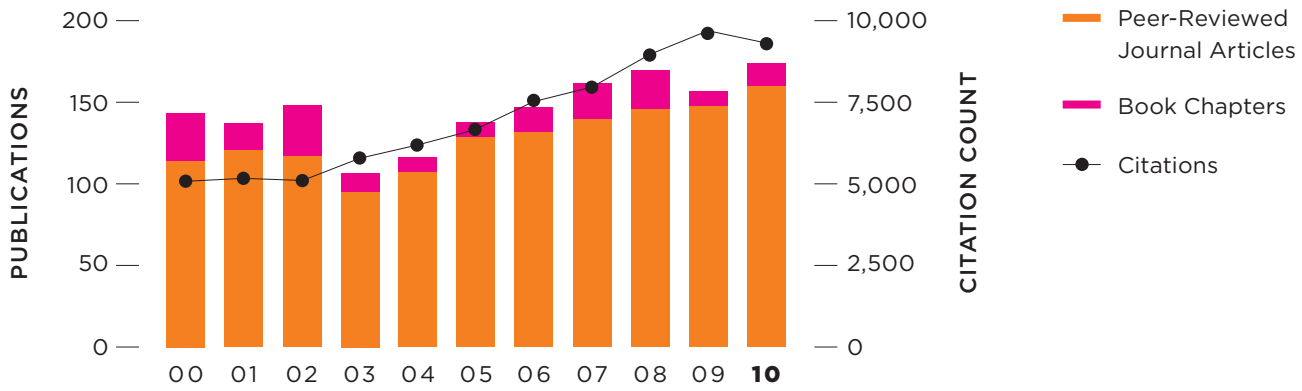


PEER-REVIEWED (EXTRAMURAL) FUNDING SOURCE

($ MILLIONS)



PUBLICATIONS AND CITATIONS PER YEAR



WE THANK THE FOLLOWING FOR THEIR CONTINUED SUPPORT OF RESEARCH AT BAYCREST

Alzheimer Society of Canada
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Canada Foundation for Innovation
Canadian Institutes of Health Research
Canada Research Chairs
Carleton University
Drummond Foundation
Élisabeth Bruyère Research Institute
Heart and Stroke Foundation
James S. McDonnell Foundation
Lundbeck Canada
Merz Pharma Canada Ltd.
Mind Science Foundation
National Initiative for the Care of the Elderly
National Institutes of Health
Natural Sciences and Engineering Research Council of Canada
Networks of Centres of Excellence of Canada
Ontario Innovation Trust
Ontario Mental Health Foundation
Ontario Neurotrauma Foundation
Ontario Research Coalition
Scottish Rite Charitable Foundation
University of Toronto – Faculty of Medicine
Canada's Research-Based Pharmaceutical Companies

We also gratefully acknowledge the research support received from the donor community through the Baycrest Foundation.

Every effort has been made to ensure the accuracy and completeness of this list. If we have erred, please accept our sincere apologies. If you have any questions, please contact Sana Mulji Dutt in Baycrest Research Communications at 416-785-2500 x 3052 or smdutt@baycrest.org.

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