ARE YOU READY TO LIVE TO 100?

More people than ever before will make it. But will they get there gracefully?
e-Reading with Grandma
And other cool innovations from the creative minds at TAGlab by Paul Fraumeni

Facebook, Twitter, e-readers, video games and the seemingly endless ‘next generations’ of smartphones. Aside from the positive impact of social media on the retail sector and job creation, is all this e-stuff really necessary? Has the social media revolution really made life better? That debate is still ongoing.

But spend some time with computer science professor Ron Baecker and the talented young minds who work with him in U of T’s TAGlab and it is easy to see that the gizmos that gizticians of people around the world use to tweet or share their vacation photos can be adapted to help people who are having trouble as they age.

“Technology that empowers: Ron Baecker (top left) with graduate student researchers Velian Pandeliev, Xavier Snelgrove and (front) research associate Liam Kaufman and the Accessible Large-Print Listening and Talking e-book. Technology that empowers: Ron Baecker (top left) with graduate student researchers Velian Pandeliev, Xavier Snelgrove and (front) research associate Liam Kaufman and the Accessible Large-Print Listening and Talking e-book.

TAGlab stands for the Technologies for Aging Gracefully Laboratory. It’s the latest in a long and impressive line of research initiatives launched over the past 40 years by Baecker — named by ACM SIGGRAPH (an international computer graphics society) as one of the 60 pioneers of computer graphics — that adapt information technology to help people learn more effectively or assist those who have a cognitive or communications challenge.

“Our mantra is ‘technologies for the journey through life,’” says Baecker. “We look at the needs people face as they age. Then we look around in our grab bag of nifty technologies and we play with them, matching people’s needs with adaptations of the technology. And then we find a bright student to explore it and build a prototype and we begin testing it.”

TAGlab, which also includes almost 20 faculty collaborators worldwide from a huge range of disciplines, has already come up with a hit — MyVoice, a mobile app and server system that operates on iPhone and Android devices and gives a voice to users with aphasia, autism and other conditions that hinder speech. Users tap words and pictures on a screen. Developed under Baecker’s direction, it is available online at www.research.utoronto.ca/edge. And other innovations are on the horizon.

Amid them is the Accessible Large-Print Listening and Talking (ALLT) e-book. There are a number of technologies available to assist people with a visual impairment or who are legally blind to access the contents of digital books. Baecker and graduate student Xavier Snelgrove (at the time, an undergraduate Engineering Science student) developed the technology, based on Snelgrove’s experience in reading with his grandmother, by then almost blind. “Xavier came up with the notion that if a machine could record his voice, his grandmother could listen to it over and over and again. Hearing his familiar voice makes the experience more pleasant than hearing a computerized voice. That idea has led to our development of ALLT, and the work is now being carried on by PhD student Velian Pandeliev and research associate Liam Kaufman.”

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Baecker says ALLT is unique in comparison to other existing e-book reader technologies because it also has a listening and talking capability. ALLT records the voice of a family member when she or he reads aloud for a person with vision loss. The recorded content can then be replayed later. The team is now beginning systematic testing of ALLT with individuals who have difficulties reading because of vision loss, or because they cannot hold books or turn pages.

Other projects have focused on the use of digital multimedia to stimulate recall, reminiscence and social engagement in individuals with Alzheimer’s disease or Mild Cognitive Impairment. For example, together with Professor Elsa Marziali of Baycrest and the Factor-Inwentash Faculty of Social Work, the team developed an effective method for creating and using multimedia biographies.

“We approach our work on three themes — giving people autonomy, helping them maintain their identity and helping them stay connected with others in their own personal communities. And we pull all that together under one question that drives us — what can you do with technology to empower people to continue to do things that were important in their lives, or even to do things that they couldn’t do before?”

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PHOTO: JOHN HRYNCHUK

For those with dementia, personhood persists
Pia Kontos is changing the rules of care by Jenny Hall

The scene: a long-term care home that serves elderly residents with dementia. It’s lunchtime. A resident is wheeled to the table in a wheelchair. He can’t speak, feed, or dress himself. Her caregivers fasten a bib around her neck.

Conventional wisdom suggests that this woman has lost touch with her world. Her disease has robbed her of her personhood. Her disease has robbed her of her personhood.

Dalla Lana School of Public Health, sees things differently. She notices that the resident carefully pulls a string of pearls out from beneath the bib, and lays it on top of the table.

“The people who take care of them — nurses, physiotherapists and other allied health care practitioners — to recognize expressions of embodied selfhood and to puzzle out their meanings.”

People with cognitive impairment are often restrained because their agitation poses a difficulty for care staff,” she says. “But we know that a lot of times agitation or resistance to care are not symptomatic of dementia. They’re meaningful self-expressions.”

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She tells the story of a male resident who would hit other residents in the head in the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room. His behaviour often prompted his caregivers to isolate him. They eventually figured out that he always removed his hat before entering the dining room.

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“They initially thought his behaviour was symptomatic of his dementia, but it actually had meaning.”

Kontos’s goal was ambitious: to change the assumptions that underlie dementia care. She faced the problem of how to communicate her ideas to caregivers immersed in a culture of care focused on the treatment — often with drugs — of ailments and symptoms.

“Embodied selfhood takes its theoretical bearings from philosophy and sociology,” she explains. “So I had to find a way to translate this idea into a framework that would be meaningful to caregivers in a focus group setting. I didn’t want to spend the whole session explaining what I meant.” So she turned to drama, collaborating with a playwright to dramatize examples of embodied selfhood. The resulting vignettes were performed live and served as a catalyst for discussion and change.

Kontos is marshalling her findings not to treat people with dementia, but to train the people who take care of them — nurses, physiotherapists and other allied health care practitioners — to recognize expressions of embodied selfhood and to puzzle out their meanings.

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Kontos is driving by what she calls “a moral commitment” to improve the quality of life for residents of long-term care facilities.

“I have been a privilege to do this research because I’m helping practitioners recognize the personhood of the people they’re caring for. And once they see it, they can’t not see it. It’s really about honouring personhood. People may have cognitive impairment, but their humanity needs to be nurtured and respected. Personhood persists.”

Healthy aging demands multidisciplinary research
PROFESSOR R. PAUL YOUNG

What does the term “multidisciplinary” mean to you?
If you’re not involved in research, it may not be a term with which you are familiar. But in so much of the kind of research that addresses problems faced by global society, a multidisciplinary approach — where experts from a variety of disciplines come together — is essential. Complex problems require a diversity of perspectives.

Take environmental research, for example. Physicists, meteorologists and chemists can examine the nature of our atmosphere and of one of the key characteristics of the environmental issue, climate change. But the problem doesn’t end there. You also need biologists, botanists, zoologists and a host of medical specialists to understand the effect of pollution and climate change on living species. And we still need more experts — such as political scientists, anthropologists, economists, business and legal scholars and engineer- ing experts to formulate policy solutions and promote behavioural change.

The focus of this issue of Edge, healthy aging, is another perfect example of how we can develop multidisciplinary solutions that can help people around the world deal with a phenomenon that is a challenging new reality — the vast majority of us will live much longer than our grandparents did.

That is why you’ll read about U of T experts whom you might not have considered when the topic of healthy aging is raised — computer scientists and literary scholars, for example, as well as researchers in nursing, medicine, economics, psychology, engineering and social work. There is no question that we could have included U of T faculty members from a multitude of other areas.

From the work of these seemingly disparate disciplines comes one conclusion — U of T scientists and scholars are making important advances in enabling people to not only live longer, but to also live better.

I hope you find this issue valuable.

R. Paul Young, PhD, FRSC
Vice President, Research

Professor R. Paul Young, PhD, FRSC
The aging boom is to be celebrated, says Professor Geoff Fernie. Especially healthy aging.

But Fernie — an engineer by training, the Institute Director, Research, at the renowned Toronto Rehab hospital and professor in the Department of Surgery and the Institute of Biomedical and Biomedical Engineering at U of T — also knows the need to face reality. And that reality is: aging is tough. “It’s not all people aged 55-plus windsurfing on a Florida beach. About one of every two of us will have a significant disability before we die. Twenty-seven per cent of Ontario families have provided care continuously for the past two years to someone in the family. The truth is that particularly daughters and wives give up their social lives and careers and live in difficult circumstances to cope with some pretty dreadful situations with aging parents. And about one in five of those caregivers need care themselves.”

It’s in tackling these problems that Fernie and his multidisciplinary team of innovators at Toronto Rehab come into play. “We see the problems older people face every day. Our commitment is to find solutions to these problems and get them out into the real world.”

How, for example, can it be made easier for older people to get up off the toilet? What do you do to get up the stairs when you can’t walk anymore? How can Fernie’s team test ideas on controlling pernicious hospital-acquired infections that so often kill the elderly? How does an 87-year-old negotiate icy streets in the middle of a Canadian winter?

To address these questions, Toronto Rehab has created test facilities that are among the best in the world. And with the official launch of the sprawling iDAPT Centre for Rehabilitation Research, Toronto Rehab is taking a bold new step into the next generation of rehabilitation research innovation.

iDAPT (Intelligent Design for Adaptation, Participation and Technology) is a $36 million initiative that includes, at its core, simulation labs that replicate pretty much every physical environment of daily life.

HomeLab, for example, is a typical one-bedroom bungalow with a working bathroom and kitchen, stairs and furniture. It has an open ceiling so researchers can observe from above.

CareLab is a dedicated hospital room where researchers can experiment with new ways of caring for patients. Lifting devices can be tested, for example, or a sensor system that reminds health care professionals to disinfect their hands upon entering or leaving the room.

The centerpiece of iDAPT is CEAL (Challenging Environment Assessment Lab) the only one of its kind in the world. This huge subterranean research lab includes a group of laboratory pods.

In WinterLab, for example, actual icy walking surfaces can be created and the temperature can be decreased to -20°C. “Everything gets worse in winter,” says Fernie. “More people get injured and sick, the death rate goes up, depression happens. There’s a lot to learn.”

Jennifer Hsu, a U of T PhD candidate in biomedical and mechanical engineering, is conducting research in this lab to improve winter slip-resistance of footwear, in collaboration with the boot and shoe industry.

Fernie sees a number of opportunities and benefits from iDAPT and CEAL.

“In addition to enabling us to solve problems, the big goal is to raise the level of interest in this critical area of research. When people used to talk about rehabilitation research in the past, there was a big yawn. But that’s changed — no one has ever done anything on the scale that we are doing here. And we have a team from across the university in rehabilitation sciences, medicine, surgery, nursing, computer science, engineering, and many others that outside experts say is the most diverse group of researchers and students they’ve ever seen.”

Fernie also believes iDAPT can play a role in rehabilitation science and research that is similar to the role the CERN particle accelerator (home of the Large Hadron Collider project) in Europe is playing for physics. “Not every rehab research group can have a set-up of this size. So we want researchers and companies from around the world to come here and work with us. We need larger teams to solve these larger problems.”

“We like big problems,” he says. “And we have the capacity and talent to work on them. We don’t let go of a problem until we’ve found the solution.”
Negotiating busy streets is different for older adults. StreetLab features a high-resolution projection system and surround sound that simulate real life street experiences. Here, U of T’s Vicki Komisar, a PhD student in biomedical engineering, is immersed in a downtown street situation.
We’re living longer. But why? What are the implications for our society and consequences of our aging population. They spoke with Edge’s Paul Fraumeni, Jenny Hall, and Paula Rochon.


**EDGE: Why are we living longer?**

**PauLa Rochon:** The fact that we’re living longer is probably a success story. We have better health care, a better diet. People used to die of infectious diseases.

**DAVID FOoT:** Let’s quickly summarize what we mean by living longer. Life expectancy has been going up two years every decade. So someone who is 50 years old has actually seen an increase of 10 years in life expectancy.

**Why is this happening?** Besides better health care, we can look at income. The richer we are individually and as a society, the more we can afford better food, and better health care. There’s an old joke in economics that if you want to live long, be rich.

**LYNN MCDONALD:** Paula touched on an important point: people just don’t die of infectious diseases anymore. But they are riddled with chronic diseases. Chronic disease is the new issue that we have to face — with a health care system that’s devoted to crisis intervention.

**EDGE: When you say a chronic disease, what does that mean?**

**PR:** Conditions people live with that stay with them forever — heart conditions, dementia, arthritis, diabetes. One of the challenges is that often people don’t have just one chronic condition; they have two or three. Our health care system has been pretty good at dealing with a single chronic condition. It’s not as good at dealing with somebody who has many. At Women’s College, we’re trying to change that. Just this summer we opened the Centre for Ambulatory Care Education Complex Care Clinic, in collaboration with U of T, specifically to treat patients with multiple chronic conditions.

**EDGE: What about advocacy programs that have taken place over the years?** For example, the anti-smoking message seems to have taken hold. Do the programs that promote healthy living have an effect?

**LM:** It’s really not something that you start to address when you’re 85. Unlike diabetes or heart disease, aging is something every one of us experiences. And it’s not something you “kind-of” fix. You can’t “kind-of” prevent the chronic conditions associated with aging. You need to start being young with programs that promote health, fitness and wellness.

**PF:** I’ve been struck with how, especially now that I’m in my 50s. We’re caregiving much longer, yes. And it’s important that you start worrying about dental health when you’re a kid.

**EDGE: Let’s talk about the effect of aging on families as caregivers.**

**PF:** People all of us have children on one hand and they’ve got their parents. It’s a huge challenge. They don’t know where the help is.

**DF:** You hear about the sandwich generation — often a joke that the sandwich has become an open-faced one. You look after your kids in your 30s and 40s, then you look after your parents in your 60s and 70s.

**LM:** We’re caregiving much longer, yes.

**PF:** It falls primarily on women.

**LM:** People forget that caregiving costs people money. After the caregiving is over, the caregiver is at a distinct disadvantage financially. And in terms of contributing to pension plans and RRSPs, women don’t get that opportunity if they are caregiving. We found women who were pawning their belongings, who were out doing caregiving for money on top of Caring for Family. And what happens when caregiving is over? The person dies, and the woman is left standing there — now what?

**DF:** One of the biggest determinants of life expectancy for men is whether you’ve got a partner, whether you’re married. It has a big positive and significant effect. Being married creates a small negative effect for women.

**LM:** If a woman’s partner dies, chances are she won’t have enough money to take through retirement. And then there’s the related question of whether the public pension system can handle the demands on it.

**DF:** The pension system is alive and well. It’s sustainable. We’re one of the few countries in the world that’s investing our pension money globally. In fact, the rest of the world looks at Canada and says we have a gold-plated pension plan. All of my research shows that you don’t really save for your retirement until you hit your 50s. You’re paying off your mortgage in your 30s and 40s and you’re raising your family. You don’t have excess cash for retirement until your early 50s. The front third of the baby boomers have done a
fantastic job. But when you look at the whole society, the big bulk of the boomers in their late 40s, of course they haven't saved, but they haven't got to the age for them to save yet.

EDGE: One of the things that David points out in his book is that people living longer creates new industries -- the eyeglasses industry, for example. What are some other positive outcomes?


PR: Our whole definition of "old" has changed. People don't think of 65 as old anymore. There are many people having very active lives. As a clinician, I don't see these people, but they're out there, successfully aging.

LM: Another positive effect is volunteerism. Sixty billion dollars is injected into the economy every year from volunteer work by people who are officially retired.

EDGE: Let's talk about work and retirement. Our ideas about this seem to be changing.

DF: The boomers, as they hit their 60s, will want to keep working, but not full-time.

LM: More people are going to work longer. The age of retirement has already gone up. This has implications. How is a 32-year-old going to manage a 70-year-old?

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PR: More people are going to work longer. The age of retirement has already gone up. This has implications. How is a 32-year-old going to manage a 70-year-old?

LM: The family is now intergenerational — there are closer to four generations in a family these days. But people are spread all over the country, which is a dilemma. It becomes difficult when there's a crisis, to be there right away. Or to talk with the doctor. I feel hopeful about grandparenting. Though, because the boomers are going to be a totally different type of grandparent. They're going to be active and involved. They will be positive role models. We really haven't had that before. Research shows that families are still tight. Families still care about their own older adults. DF: I'd like to throw something else out. This is anecdotal, but actually I think it's what's going to happen. A lot of boomers, and particularly boomer women, because they live longer, are going to be on their own. People in the baby boom were having four kids, so most of us boomers now have three brothers and sisters. I think we're going to see siblings moving in together and supporting each other. Or people in book clubs, for example, where they suddenly say, "Let's all get a condo together." They'll have one doctor that comes in and helps them all. And that doctor then will see five patients — it will be in their interest, economically, I think that family is going to be reformed along these lines.

LM: One of the things we need to think about is that you can't wait until you're in a crisis situation to start making those kinds of decisions. We need to make it easy for people to do those sorts of things.

EDGE: Yes. Consider driving. There's a certain point in your life where you probably shouldn't be driving. But you still need to get out and run errands and see people.

DF: I've got data that show it doesn't matter what city you're in, you're much less likely to use public transit as you get older.

LM: Losing your car is an emotional issue. People view it as a loss of independence, even if they have all the resources in the world and can call a cab whenever they want.

EDGE: We need a 'collective' type system. Little buses that I call up an hour ahead and say, "Pick me up at my front door." It's a public transportation system. It cruises the neighborhood. It picks me up at my door. It's a public transportation system. It cruises the neighborhood. It picks me up at my door. "It's a public transportation system. It cruises the neighborhood. It picks me up at my door."

LM: It's not about facilities. There is a mismatch between health care resources and the population. For example, there are very few geriatricians in Canada. There's absolutely no way that we have enough specialists. We have to think about different models of care. A lot of old people I see want to be in their homes. We have to find ways to provide care so that people can stay in their homes, but then go in for treatment for complex problems. Or better still, I have some of that care provided in their homes, taking advantage of a range of health care professionals including phar- macists and dieticians. It's not about just a doctor and a hospital. This is a challenge we have not fully addressed.

LM: Your social network is the biggest contributor to your health. You may have a medical problem, but the real issue is if you live in a small town and you have no care services, you need somebody who's going to show you where to get the help you need.

DF: Let me just overlay something else on top of this. You live downtown in your 20s, suburbs in your 30s and 40s, more peace and quiet in your 50s and 60s. Why do we build hospitals where all the young people are, in downtown areas?

LM: Mark Rosenbeg, a medical geographer at Queen's, has shown quite clearly that older people are living more in the suburbs, where there are absolutely no services.

EDGE: One final question. What would you tell young people today about healthy aging?

LM: Take really good care of yourself.

DF: Get a good education, so you have some money.

PR: Education is crucial, because income is crucial, so you have options down the road.

OPPORTUNITY OF THE

Boom? Three U of T research leaders offer their perspectives on the nature of the aging Boom and consequences of our aging population. They spoke with Edge's Paul Fraumeni and Jenny Hall.
What systems and resources are needed to support healthy aging? The question strikes at the heart of Mike Carter’s work. A professor in the Department of Mechanical and Industrial Engineering (MIE) and founder and academic director of the Centre for Research in Healthcare Engineering, Carter has developed two models to help governments plan health services for the aging population.

“Over the next 15 to 20 years, as baby boomers age, the health care system is in for a rough ride,” he says. “Economically, it’s a bad idea to simply move people into institutional homes. Most people want to live independently at home.”

How will they accomplish this? By accessing community supports, including meal delivery services and programs that help with personal care activities. The community support sector has grown organically through small, independent agencies, and hence the current patchwork of services in the province does not necessarily follow the people who need them the most.

That said, Carter has created models to help policy-makers see service gaps from a big-picture perspective. One example is the population-based allocation model (PBAM). Developed with Ali Vahit Esensoy, a PhD candidate in MIE, the PBAM grew out of a need among Ontario’s Local Health Integration networks (LHIns), regional collections of health care services and centres. Starting in 2007, the provincial government distributed more than $1.1 billion to the LHIns through the Aging at Home strategy. The initiative was aimed at helping seniors to maintain good health and live independently in their own homes. But without an accurate assessment of existing services or local demand for them, the LHIns were concerned the funding wouldn’t go to the areas of greatest need.

Using Statistics Canada data and in collaboration with service providers, Carter and Esensoy created profiles of the users of community support services. That information, in turn, was compared to the local supply of support services. From there, the researchers generated interactive maps that showed the distribution of service gaps in all the LHIns.

“So instead of using intuition or trial and error, policy-makers are using these data-driven tools to identify where resources are most needed,” says Carter.

Going one step further, he and Esensoy have also created a model that evaluates the ripple effect of health care investments before funds are even allocated. The project also involves U of T researchers Timothy Chan (MIE) and Susan Bronskill of the Department of Health Policy Management and Evaluation.

Focusing on seniors, the investment response model (IRM) was developed with input from health service providers and experts from Ontario’s health ministry and the LHIns. The resulting model analyzes the system-wide flow of elderly patients from five perspectives: the demand placed on hospitals, the burden experienced by informal caregivers, and the availability of home and community care, rehabilitation and long-term care services. Consequently, the IMR forecasts how investments in one area affect the patient flows across the entire system. And perhaps most importantly, the model estimates how long it might take for investments to make an impact.
Baycrest’s amazing Virtual Brain

Randy McIntosh is helping us understand the mysteries inside our heads by Jenny Hall

Randy McIntosh’s brain isn’t very smart. It’s about as astute as your average three-year-old. But it’s getting smarter every day.

Housed in a supercomputing data centre, this “brain” is actually a model created by the Brain Network Research Group (Brain NRG), a consortium of 16 universities. McIntosh, a psychology professor at U of T, vice-president of research at Baycrest and director of Baycrest’s Rotman Research Institute, helped found Brain NRG.

Much of neuroscience has focused on brain structure, seeking to map the architecture of the brain and to understand the connections between brain areas. With advances in biophysics over the past few decades, scientists have been able to measure brain function in living humans and in animals using sophisticated neuroimaging techniques, moving toward an understanding of how stimuli are processed by the brain. Think of brain structure like a picture and brain function like a movie.

But so far the “movie” has been limited to simple studies — a text subject gets an MRI as part of a research study and the result is information about how that person’s brain responds to, say, listening to a certain piece of music.

McIntosh’s “Virtual Brain” is one of the first projects to model brain structure and function simultaneously. It is a fluid, responsive model that can show how the brain responds to anything from looking at a picture to undergoing a stroke.

“It’s like an athlete,” says McIntosh. “You can look at an athlete’s body standing there, but it’s hard to appreciate what they can do until they actually do it. With the brain, you can see the pipelines, the wires that connect certain brain regions, but until the brain is actually engaged, you can’t really appreciate how structure enables and constrains function.”

Recent years have seen an explosion of data collected on brain structure and function. McIntosh’s group is collating the data to create and refine their model.

They started with a model of a monkey brain. It produced the same patterns of activity seen in functional neuroimaging studies of real monkeys, effectively validating their methods. They then modeled brain structure and function of a human child and were able to “age” the brain a few years. The ultimate goal is to create a prototype of an adult human brain.

The applications are potentially game-changing. Imagine physicists being able to input the architecture of a stroke patient into the model. The Virtual Brain would allow them to test potential treatments, including learning about how the patient’s brain could revive itself.

“There are a number of ways of getting from point A to point B in the brain,” says McIntosh. “Can we take a patient’s brain and facilitate recovery using new pathways?”

“The Virtual Brain will also help scientists understand aging. “We know that in aging there are multiple changes in the white matter in the brain. These changes have very few consequences in some people, but in others they have devastating consequences. What is it that makes one person resilient and another person not?”

Aside from prognostic innovations, the Virtual Brain could revolutionize basic research. “It’s become a virtual lab. Things you can’t do experimentally in a human brain you can do in the Virtual Brain, just to see what happens.”

Surprisingly, the biggest hurdle in getting the project going wasn’t scientific, but cultural. Creating the Virtual Brain required computer scientists to write the programs, neuroscientists who understood cognitive processes and clinicians who had access to patients. Historically these groups don’t have much in common, or much reason to collaborate, says McIntosh. “We started speaking the same language and working toward the same goal, and all of a sudden this huge innovation came about.”

Baycrest’s Randy McIntosh: “Can we take a patient’s brain and facilitate recovery using new pathways?”

A prescription for muscle health

Catherine Amara and Konstantina Katsoulis are focusing on older women by Althea Blackburn-Evans

Much has been said about the importance of maintaining muscle to promote bone strength as we age, but muscle health plays a much broader role in keeping older adults healthy, says Catherine Amara.

“It’s not only the quantity of muscle that’s important. The quality of muscle impacts metabolism, and metabolic complications can impact health, mobility and the ability to live independently.” The professor in the Faculty of Physical Education and Health is working with doctoral student Konstantina Katsoulis to evaluate the best strength-training regimes for their subjects and then evaluating body composition, muscle quality and bone mineral content using the state-of-the-art equipment in Amara’s lab. They’ll also investigate the impact of their unique training protocol on aerobic and anaerobic capacity.

Amara and Katsoulis plan to conduct their study in six-month intervals, creating strength-training regimes for their subjects and then evaluating body composition, muscle quality and bone mineral content using the state-of-the-art equipment in Amara’s lab. They’ll also investigate the impact of their unique training protocol on aerobic and anaerobic capacity: “Some research shows that resistance training in older adults also has aerobic benefits — something we don’t see in younger adults.”

This striking adaptive response of older muscle to resistance training is likely related to the reduced quality of muscle in the older cohort.

Aiming to share ideas and insight with colleagues in other disciplines, Amara and Katsoulis joined U of T’s Collaborative Program for Women’s Health — a unique inter-Canada program that brings together scholars from nearly 20 faculties and departments at U of T. The common focus on women’s health will help Amara shape her research program. “While there’s certainly research that demonstrates both men and women adapt very nicely to strength training, there are reports of differences in the way their muscles adapt and in how improvements in functional capacity are achieved. So we are interested in looking specifically at some of these gender differences.”

Amara hopes the interdisciplinary connections she makes through the Collaborative Program will generate bigger benefits down the road. “We want to identify broader ways of applying our research results to people in the community.”

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**Better knowledge = better care**

Kathy McGilton helps health professionals improve their knowledge of gerontology by Dana Yates

A broken hip can have a major impact on an older person’s health and ability to live independently. But researcher Kathy McGilton doesn’t believe it has to be this way — and improving the situation will require reshaping the beliefs of health care professionals.

A professor in U of T’s Lawrence S. Bloomberg Faculty of Nursing and the Graduate Department of Rehabilitation Sciences, McGilton is also a senior scientist at the Rehab Institute. She has always appreciated how a practitioner’s outlook can ultimately affect an older patient’s outcome.

“Nobody wants to get old,” McGilton says. “Our society is so focused on staying young that this thinking infiltrates our attitudes as health professionals and underlines our clinical practice.”

The result, she says, is a system in which seniors may be denied access to vital services that support healthy aging. As proof, McGilton points to hip-fracture patients. Following surgery, if patients show symptoms of cognitive impairment, such as agitation and confusion, they may be moved to a long-term care facility instead of a rehabilitation centre. While in a nursing home, patients may not receive appropriate rehabilitation, making it unlikely they will regain their previous level of physical functioning.

Her study is trying to provide empirical evidence that people with cognitive impairment, if given the chance at rehabilitation, can go home.

The key, McGilton believes, is to teach nurses how to differentiate dementia and delirium. The former has a slow onset, while the latter comes on quickly. Delirium also has a variety of causes, including dehydration, post-surgical pain and an electrolyte imbalance — all of which are treatable.

McGilton was inspired to pursue research into delirium among older adults when she spoke to her own 98-year-old grandfather, who confided that he’d never expected his own retirement to last so long. Cook was captivated when she considered the onslaught among baby boomers of the same condition.

“I was thinking, if they’ve been the generation to finish high school, go on to college and university in such high numbers and do continuing education in the workplace, ‘she says, ‘then they were going to be looking for learning opportunities in retirement.’

Cook, currently a post-doctoral fellow at the University of Toronto-affiliated Baycrest, one of U of T’s nine partner hospitals, has her hunch as part of her doctoral research at U of T’s Ontario Institute for Studies in Education. She wanted to know how the quest for lifelong learning continued in retirement, particularly as it applied to those ages 55 and older who volunteered in the formal, structured way for a non-profit organization. Her findings confirmed that for many of her respondents, volunteering did indeed fuel an important intellectual need, whether they were making use of skills they’d acquired during their working years, or learning new ones — such as the nuts and bolts of building a house with Habitat for Humanity.

McGilton says that the signs of delirium among older adults indicates a larger problem in the health care system: a limited grasp of gerontology. Encompassing more than physical health, gerontology considers the complete spectrum of an older person’s life, including his or her support system and mental and emotional well-being. In a health care setting, nurses can bring the study of gerontology to life by, for instance, speaking directly to patients, focusing on their pre-morbid functioning and their abilities, getting them out of bed, managing their pain and learning more about their personal lives.

That said, McGilton has undertaken several initiatives to enhance nurses’ knowledge of gerontology. “Older adults are our core business,” she says. “We make up to 60 per cent of medical-surgical patients and 50 per cent of patients in intensive care units. We need to increase our awareness of real issues in the hospitals.”

To that end, McGilton and her colleagues have helped add more gerontology-related content and case studies to the nursing curriculum at U of T. For example, a new undergraduate elective course (“Complex Issues in Gerontology”) has been introduced, as has a graduate-level course on best practices in caring for the elderly. In addition, to increase nurses’ expertise, information sessions have been offered to faculty members in nursing, social work and medicine.

“Caring for the elderly isn’t up to nurses alone,” McGilton says. “Many health care professionals play a role in decisions that affect older patients’ lives, and we need to have better attitudes, assessment skills and knowledge of best care for older people. We need to change the way we care.”

What happens when you live longer than you expected? So much longer, that three decades have passed since you retired, and you’re still alive and well late into your 90s? That question first occurred to Dr. Suzanne Cook while she was teaching a gerontology course at the University of Guelph and observed the high number of seniors who were volunteerunteering at the same community organizations as her placement students.

It became more personal when she spoke to her own 98-year-old grandfather, who confided that he’d never expected his own retirement to last so long. Cook was captivated when she considered the onslaught of baby boomers set to emerge in the 21st century. “I was wondering if organizations should be paying more attention to this, to creating opportunities for lifelong learning, and are they creating them?” Specifically, she wondered whether developing more targeted, challenging roles for older volunteers would bolster recruitment and retention, just as it does in the paid workplace. “That’s something I’m currently exploring as part of her post-doctoral work at Baycrest’s Rotman Research Institute, where I am involved in a four-year study known as BRAVO — Baycrest Research About Volunteer- ing Among Older Adults. The BRAVO team — led by senior scientist Nicole Anderson (who is also a U of T associate professor in the Departments of Psychology and Psychiatry) and managed by a group of retired volunteers — is looking at a host of potential physical, cognitive and psychosocial benefits related to volunteering. Subjects, aged 55 and older, are recruited to volunteer at Baycrest for a year, during which time they are followed and reassessed at six month intervals. Cook is working on the qualitative side, leading the team of volunteers that is conducting the interviews and coding and analyzing the data.

In addition to testing the healthy-aging hypothesis, it’s expected the study will give Baycrest and other non-profits some important clues about attracting older adults, volunteers and keeping them engaged and mentally stimulated. Cook predicts that could have a big impact on social policy, as Canada grapples with an aging, increas- ingly educated population and mounting healthcare costs.

“I think society needs to encourage and cultivate opportunities for later life learning,” she says. “That includes the need for non-profits to consider the kinds of activities that can occur through volunteer activities, and to make it a priority in volunteers’ roles.”

Photographs by Marc Wiese

**Does volunteering benefit older adults?**

Suzanne Cook’s research finds an intellectual need is satisfied by Karen Gross

Suzanne Cook says her conclusions raised another question: “I was wondering if organizations should be paying more attention to this, to creating opportunities for lifelong learning, and are they creating them?” Specifically, she wondered whether developing more targeted, challenging roles for older volunteers would bolster recruitment and retention, just as it does in the paid workplace. “That’s something I’m currently exploring as part of her post-doctoral work at Baycrest’s Rotman Research Institute, where I am involved in a four-year study known as BRAVO — Baycrest Research About Volunteer- ing Among Older Adults. The BRAVO team — led by senior scientist Nicole Anderson (who is also a U of T associate professor in the Departments of Psychology and Psychiatry) and managed by a group of retired volunteers — is looking at a host of potential physical, cognitive and psychosocial benefits related to volunteering. Subjects, aged 55 and older, are recruited to volunteer at Baycrest for a year, during which time they are followed and reassessed at six month intervals. Cook is working on the qualitative side, leading the team of volunteers that is conducting the interviews and coding and analyzing the data.

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The result, she says, is a system in which seniors may be denied access to vital services that support healthy aging. As proof, McGilton points to hip-fracture patients. Following surgery, if patients show symptoms of cognitive impairment, such as agitation and confusion, they may be moved to a long-term care facility instead of a rehabilitation centre. While in a nursing home, patients may not receive appropriate rehabilitation, making it unlikely they will regain their previous level of physical functioning.

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Reframing the story of Alzheimer’s disease

When we talk about Alzheimer’s disease, what kind of story are we telling? A horror story, at least here in contemporary North America, says Marlene Goldman. “The media’s take on Alzheimer’s is very Gothic and apocalyptic,” she says, a story of the slow loss of mind and self. “The typical presentation is: we have a huge baby boomer population and they’ll be turning 65. In the media’s view, they’ll be zombies. And we’ll have to pay for them.”

The English professor at the University of Toronto Scarborough doesn’t discount the suffering associated with Alzheimer’s disease, but she wants us to realize that the way we talk about it matters. She is working with a group of scholars in humanities, medicine and social science through U of T’s Jackman Humanities Institute and recently co-organized an international conference called Aging, Old Age, Memory and Aesthetics.

As a literary critic — someone who studies and interprets literature — Goldman is interested in the intersections between medicine and storytelling. “I think we make a mistake when we assume that a disease is like a table, an unchanging thing that’s here in front of us. Our understanding of diseases has evolved throughout history.”

It’s hard to imagine a different version of the story we tell ourselves about Alzheimer’s disease because we’re so embedded in our own culture. But, says Goldman, “A literary analysis opens up the possibility of seeing things from a different angle.”

“We’re accustomed to thinking of fiction as ‘not true.’ But fiction, Goldman says, can ‘show us an illness from the mind of a sufferer.’ In a medical setting, a clinician might take a case history but it’s always filtered through that clinician’s perspective. In the other hand, let’s see what Alzheimer’s might be like from the inside.”

In other words, Goldman wants us to know that we have a choice about how we tell the story. “We can see Alzheimer’s as a Gothic, tragic story,” as the mainstream media presents it, or we can look for alternative perspectives.

She gives the example of Alice Munro’s short story “The Bear Came Over the Mountain,” which Canadian director Sarah Polley made into the film Away From Her. In it, Grant, a self-confessed philandering husband witnesses his wife Fiona’s rapid decline. Knowing her condition will worsen, Fiona checks herself into an institution. When Grant visits, he is shocked to discover that Fiona has formed a passionate attachment to another resident. Grant wonders if Fiona is playing an elaborate trick on him — he doesn’t know whether Fiona’s feelings spring from her illness or are a purposeful commentary on his past infidelities. “As in other Alzheimer’s narratives such as Michael Redhill’s Goodness and Mordecai Richler’s Barney’s Version,” says Goldman, “the presence of an ironic trickster figure undercuts the dominant media and biomedical discourses of Alzheimer’s.”

“I don’t want to diminish or make light of the real suffering associated with memory loss. But I do think it’s helpful to have as much information as possible when looking at life changing illnesses.”

“We’re all aging,” says Goldman. “That’s an inevitability. I don’t like the idea that we have to live in fear of any sign of aging, that the story has to be solely one of decline.”

PHOTO: JOHN HYNDIUK

Reframing the story of Alzheimer’s disease

Literary theorist Marlene Goldman on how we narrate memory loss by Jenny Hall
Dementia, osteoporosis, diabetes. These are diseases of aging, right? Wrong, according to new understanding of how we travel through life on developmental trajectories that are established in our earliest years — and even in utero. Though symptoms may not manifest themselves until later in life, it’s increasingly clear that the foundation for health and well-being is laid long before most of us start to worry about RRSPs.

U of T is poised to become a global leader in the study of these developmental trajectories with the establishment of the Institute for Human Development. A group of researchers, led by Stephen Lye of Obstetrics and Gynaecology and Physiology, is set to launch the institute with a $1 million grant from U of T’s Connaught Fund. Lye is also senior scientist and associate director of research at Mount Sinai Hospital’s Samuel Lunenfeld Research Institute. He is a world leader in the field of women’s and infants’ health. The Connaught Global Challenge Award will enable him and collaborators across campus to launch an ambitious research program aimed at understanding the relationship between children’s earliest experiences and well-being throughout the life course.

When asked about aging, Lye thinks about pregnancy. “You start with a fertilized egg. A single cell. Over the course of just 40 weeks, that cell develops into a perfectly functioning human being. Think about it: the cells have to decide whether they’re going to form a placenta or whether they’re going to form the embryo itself. Then that collection of cells has to implant into the uterus. The organs have to form. Then all the nerves and the blood system have to connect up everything. Everything is kept between tightly-controlled levels — our hormones and blood sugar have to stay within the appropriate range. If there was ever a use for the term ‘miracle,’ that’s got to be it.”

It doesn’t stop there. In the few years after a baby is born, a staggering amount of brain development must occur. So how does this all relate to aging well?

Historically, science has believed that genetics is destiny. Scientists are, however, increasingly coming to understand that it is the interaction between genes and environment that is important. Still, these interactions are not well understood. Lye offers an example. Past research has discovered a particular gene linked to obesity. “There are two variants of this gene, an adverse variant associated with high body mass index (BMI) and a normal variant. We’re looking at the impact of this variant throughout fetal life and after birth.” It would seem that babies with the adverse variant are destined to become obese, but that’s not necessarily the case. Lye and his colleagues found that those babies with the adverse variant who were exclusively breastfed for the first six months of life grew up to have lower BMIs than they otherwise would have. In this case, breastfeeding acted as an environmental influence that mitigated the potential negative effect of the adverse genetic variant.

There are potentially thousands of other environmental interventions that can affect the expression of our genes. Lye stresses that the new institute won’t focus solely on health. Similar work will examine the impact of development on children’s ability to learn and on how they form relationships as children and adults.

“The essence of this project is to discover how trajectories are set early in life and how they impact health, potential for learning and social functioning. And we believe the way to do our investigation most effectively is by looking at the trajectories from a multitude of perspectives.”

A team of co-senior investigators from a broad range of disciplines is working with Lye on this project. They include Carl Corter of Human Development and Applied Psychology at the Ontario Institute for Studies in Education (OISE), Alison Fleming of Psychology at the University of Toronto Mississauga (UTM), Jennifer Jenkins of Human Development and Applied Psychology at OISE, Stephen Matthews of Physiology and Marla Sokolowski of Biology at UTM. The group is planning to go beyond just understanding the trajectories we set ourselves on. “We’re going to ask what we can do to modify these trajectories,” says Lye. “We don’t just want to study this. We want to have outcomes. We want to focus on how we can optimize the full potential of our children.”

Healthy aging isn’t only a concern for us, it seems. It’s something we can help our kids prepare for now.