



WESTERN MICHIGAN UNIVERSITY

RESEARCH ISSUE
SUMMER 2015

Magazine



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Issues in Aging

U.S. hits record high
life expectancy (CDC)

78.8
years



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Frequency
The *Western Michigan University
Magazine* is published quarterly. It is
owned by Western Michigan University,
1903 W. Michigan Ave., Kalamazoo, MI
49008-5433.

Volume 2015: Issue 3

Views expressed in the magazine are not
necessarily those of the University. WMU
is an equal opportunity/affirmative action
institution and a member of the Associa-
tion of Public and Land-Grant Universities
as well as the Council for Advancement
and Support of Education.

Correction: Alumna Carolyn A. Schten
was mistakenly listed in the spring edi-
tion's "In Memoriam" section. The listing
should have included Arnold Schten, BA
'50, MA '60, who died on Dec. 28, 2014,
in Kalamazoo.

Full Frame

Built in 1872, a South Haven Lighthouse has been witness to shipwrecks, torrential weather and countless visitors to the Lake Michigan shore. Meticulous lighthouse keeper logs provide insight into shoreline life in long-ago days. To bring this history to a wide audience, technicians from University Libraries recently digitized several logbooks spanning the years 1872 to 1880. On page 30, learn about the project to put the journals online.



Dear Friends,

We are told we will be living much longer thanks to stunning advances in medical research and lifestyle practices. What is the quality of life we can look forward to in those added years?

Just as we should plan early for our financial well-being in our later years, we also should plan ahead for our bodies to be healthy as we reach and enjoy retirement. Living longer means we want to keep our bodies in good working order and protect our vital organs.



Among the many parts to be concerned about, and one of the body's most important and complex organs, is the brain. New discoveries help grow our understanding of how the brain functions and how we can improve our odds for better memory retention as years go by. Ed Roth, professor of music therapy at WMU, investigates the brain, the role music plays in cognition and the remediation of health problems that can come with aging.

Mobility also is a key factor in quality of life. Researchers in occupational therapy seek to understand ways to ease pain and stress on joints and muscles by adjusting how we use our bodies in the workplace and at home. They counsel health care providers to help aging community members reside safely in their homes, including how to avoid injurious falls that become more difficult to heal in senior years.

Elsewhere in the magazine, we revisit a scholar whose body of research has made a powerful impact on the curriculum models that trained the generation currently at work caring for our elderly. You will learn how Sandra Glista's career has evolved over the past 40 years as she's studied aphasia, a communication disorder caused by brain damage.

The discovery programs underway at Western Michigan University remain an exemplar for what this institution strives to do each day—improve the body of knowledge that impacts the lives of those in our local, regional, national and global communities. On the following pages,

you will read about technological advances for flight training, identity creation and social therapy, digital-age barriers to literacy, heart disease and Lake Michigan lighthouses. These are just samplings that illustrate the diversity in our discovery activities.

Please enjoy learning about the wonderful impact discovery has here at WMU and, thereby, across the globe.

Best regards,

John M. Dunn, Ed.D.
President

Daniel M. Litynski, Ph.D.
Vice President for Research

Former President Elson Floyd succumbs to cancer at 59

Dr. Elson S. Floyd, WMU's sixth president, died in Washington in June after a battle with cancer. He had served as Washington State University president since 2007.

Floyd, 59, was president of WMU from 1998 to 2003, a tenure marked by a series of major developments that have had a lasting impact on the campus and community.

WMU President John M. Dunn said that Floyd's death represents a profound loss for WMU and higher education as a whole.

"He went on from his very successful presidency at Western Michigan University to take other important leadership positions and carve out a national reputation through his work with organizations like the American Council on Education," Dunn said.



"Here at WMU, we are still building on some of the accomplishments of his presidency and the initiatives he launched. One such effort—the establishment of the WMU Business Technology and Research Park—has had a tremendous impact on our community's economy and has meant hundreds of new job in dozens of high-tech businesses.

"Our deepest condolences go to his family for this loss, too early, of their loved one," Dunn said, adding that the campus now focuses on honoring Floyd's special legacy. ■

Osher Institute fall class lineup

The Osher Lifelong Learning Institute fall course lineup will be available on Aug. 1. The institute provides intellectual and cultural learning experiences for mature adults in an informal and stimulating environment. Visit wmich.edu/olli or call (269) 387-4200 for the fall schedule, and to learn about current courses and trips. ■

Researcher wins \$416,385 NIH grant to study drugs known as 'bath salts'

A psychology professor has landed a three-year, \$416,385 grant from the National Institutes of Health to research the behavioral pharmacology of novel stimulant drugs.

Dr. Lisa Baker will use animal models to evaluate the abuse potential of various chemical constituents of drugs known as "bath salts." Though called "bath salts," the drugs have nothing in common with consumer products used for bathing. Rather, they encompass a variety of recreational drugs dubbed "bath salts" to evade laws banning their importation.

The drugs are synthetic cathinones derived from a plant in Africa and the Middle East whose leaves people chewed for a boost

of energy. They were first synthesized in the 1920s, but remained obscure until they were rediscovered by underground chemists in the first decade of the 21st century and began to be used in designer drugs.

In 2011, the United States classified synthetic cathinones as schedule I substances, meaning they have no accepted medical use and have high abuse potential.

Baker's grant is through the Academic Research Enhancement Award—AREA—program sponsored by the NIH. The program supports research projects at educational institutions that provide baccalaureate or advanced degrees for a

significant number of the nation's research scientists, but that have not been major recipients of NIH support. The awards are intended to support meritorious research, expose students to research, and strengthen the research environment of the institution.

"The AREA grant is meant to encourage faculty research," Baker says, "but, more importantly, to engage students in that research."

Baker's and her students' research will expand on current knowledge regarding the behavioral and pharmacological effects of synthetic cathinones and could impact future developments in substance abuse treatment. ■

WMU racks up seven DownBeat awards



WMU jazz students came up big in DownBeat's 38th Annual Student Music Awards, winning seven awards and tying for second in the world.

The strong finish puts WMU in good company, in second place with the University of Music and the Performing Arts in Graz, Austria, a highly regarded program in its own right. The only program to win more awards was the University of Miami, with 18 awards.

WMU honorees:

- Lasse Grunewald Quartet, Small Jazz Combo, Graduate College Outstanding Performance, Andrew Rathbun, professor.
- Sam Alhadid, Vocal Jazz Soloist, Undergraduate College Winner, Greg Jasperse, professor.
- Monica Pabelonio, Vocal Jazz Soloist, Undergraduate College Winner, Greg Jasperse, professor.
- Out of State, Small Vocal Jazz Group, Undergraduate College Winner, Greg Jasperse, professor.
- Kellen Boersma (guitar), Blues/Pop/Rock Soloist, Undergraduate College Winner, Andrew Rathbun, professor.
- Elliot Weeks, "Dust of Snow," Original Composition-Small Ensemble, Undergraduate College Outstanding Composition, Andrew Rathbun, professor.
- Elliot Weeks, "Dust of Snow," Original Composition-Large Ensemble, Undergraduate College Outstanding Composition, Greg Jasperse, professor.

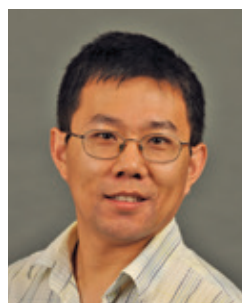
Over the past three-plus decades, WMU has tallied more than 150 DownBeat Awards. This strong showing in the contest places the University squarely among the top five award-winning programs in the world.

Results of DownBeat's 38th annual Student Music Awards were presented in the magazine's June issue. ■

WMU climatologist involved as official observer at UN climate convention

A WMU assistant professor of geography and environmental and sustainability studies was an invited observer at the United Nations Framework Convention on Climate Change in Lima, Peru.

A climate researcher who also teaches about meteorology, climatology and climate change at WMU, Dr. Lei Meng says it was enlightening and important for him to hear firsthand the views of international policy makers as they negotiated world governments' commitment to combating climate change.



Meng

Meng was in Peru in December as part of a five-member delegation of the Association of American Geographers granted status at the convention as non-governmental organization observers. There was another climate convention this summer in Germany.

The goal of these UN climate change conventions is to keep world governments on track toward a universal climate change accord to cut the fossil fuel emissions that scientists say cause global warming. The

intention is to limit warming to 2 degrees Celsius.

Meng says he left the summit feeling optimistic, but added that there's an urgent need for world governments to take action.

"Global warming has produced catastrophic results on society and environment. If we don't take action now, it will cause more damage and become harder to mitigate and adapt to climate change," he says.

Agreements forged in negotiations are expected to be finalized at the next UN climate convention, which will take place in Paris later this year. ■

Team's 'Local Loop Farm' wins \$15,000 sustainability prize

A team of five WMU students has won the 2015 Wege Prize, besting teams from around the nation in the eyes of an international panel of judges whose task was to assess the teams' ability to use design principles to tackle sustainability problems.

The WMU team captured first place and a \$15,000 award March 28 in an event the Grand Rapids-based Wege Foundation calls a "gathering of the brightest collegiate minds in America to solve a truly wicked problem."

Second place went to a team from Kendall College and Savannah College. Third place was awarded to a team made up of students from Savannah College, Kendall College and Penn State University.

Design contest competitors asked teams of five to work collaboratively across institutional and disciplinary boundaries to create a circular economy—a tightly looped, restorative economic cycle within which resources can be re-adapted for use without limiting the desirability of products or the loss of revenue.

The WMU team designed The Local Loop Farm, an agricultural system that exists symbiotically with the surrounding community, using complementary systems to increase economic, environmental and biological effectiveness. Building on research done by WMU's Office of Sustainability, the team used current technology for its design, including hydroponic grow beds, fish cultivation and hot water composting.

The WMU team, competing under the name Western Sustainers, included:

- Max Hornick, a public relations major
- Ramon Roberts-Perazza, a civil engineering major
- Kelsey Pitschel, a civil engineering major
- Elijah Lowry, a geography major
- Cara Givens, a biomedical science major

The Western Sustainers were advised by two recent WMU grads, Kyle Simpson from Novi and Carlos Daniels from Detroit, as well as Josh Shultz, who is the permaculture coordinator in the Office of Sustainability. ■

Inventive duo wins \$10,000 Lemelson-MIT 'Cure it!' prize

A new alumnus and a WMU senior featured in the spring edition of the *WMU Magazine* have won a national prize for their life-saving, low-cost invention, NeoVent, a respiratory support device designed to treat critically ill infants in developing nations.

Alumnus Stephen John and senior Joseph Barnett are among the winners of the Lemelson-MIT National Collegiate Student Prize Competition, a search for the most inventive team of undergraduate and individual graduate students in the nation.

The two won \$10,000 in the program's "Cure it!" category for inventions that can improve health care.

Babies born preterm sometimes have underdeveloped lungs and need some degree of respiratory life support. But, due to expense, ventilation equipment commonly available in developed nations is not always readily available in medical centers in underserved parts of the world. They estimate that NeoVent will be priced at around \$25 versus the thousands of dollars a ventilator costs.

The Lemelson-MIT prize isn't the first support the WMU pair has garnered for NeoVent. The team won a Research and Creative Activities Award from the Lee Honors College, and they were a part of WMU's student business accelerator, Starting Gate. ■

Pulitzer Prize-winning graphic novel is the 2015-16 University Common Read

Art Spiegelman's graphic novel "Maus I: A Survivor's Tale" has been selected as the 2015-16 University Common Read. In 1992, the work became the first graphic novel to win a Pulitzer Prize and was twice nominated for the National Book Critics Circle Award.



While all first-year students are expected to read the book, WMU is inviting all to read the book this summer and participate in public activities planned for the fall.

"Maus I" is part one of the story of Vladek Spiegelman, a Polish Jew who survived Hitler's Europe as well as Auschwitz, and Art Spiegelman, Vladek's cartoonist son and the novel's author.

Through "Maus," the younger Spiegelman tries to come to terms with his father, his father's terrifying story and history itself. It is told metaphorically through characters drawn as animals, with mice representing Jews, cats representing Germans and pigs representing Poles.

For more information, visit libguides.wmich.edu/wmucommonread2015-16. Upcoming events and other aspects of this year's common read will be posted on the site throughout 2015-16. ■

Researcher wins state grant for Parkinson's study

JoAnne McFarland O'Rourke, director of research for the WMU College of Health and Human Services, has received the 2015 Raymond Bauer Research Award for \$20,000 from the Michigan Parkinson Foundation.

A chief aim of McFarland O'Rourke's research is to delineate treatment methods that address comorbid conditions that accompany Parkinson's disease. As the conditions combine, it is often difficult



for patients and practitioners to sort out comorbidities, including which symptoms take priority and which may be contributing to others, she says.

The progressive nature of Parkinson's disease makes early diagnosis and treatment important and creates a need to find ways to alleviate and delay symptoms.

McFarland O'Rourke's research will include a randomized, controlled study evaluating two neuro-feedback treatment protocols. One will address physical symptoms, while the other will target physical and mental health aspects of the disease.

The study is intended to address the comprehensive nature of Parkinson's disease and lead to more effective, holistic approaches to treatment, in addition to delineating symptoms that can best be addressed without medication. ■

Survey says BTR Park thriving

A recent survey highlights the many successes of WMU's Business Technology and Research Park on the Parkview Campus.

Bob Miller, associate vice president for community outreach and BTR Park point person, says the park is now full and looking toward expansion in a nearby parcel of land already designated for that use.

The park houses 41 companies and 816 employees who work in businesses located in the park. All told, 1,235 employees work on the Parkview Campus. Of that total, 419 are WMU faculty and staff members working in College of Engineering and Applied Sciences facilities.

In addition, Miller says 183 WMU students have held internships with private companies in the park since the first company opened there in 2001. ■



WMU singled out for championing college access

WMU is one of six "outstanding" college access advocates to receive the inaugural College Access Impact Awards from the Michigan College Access Network for contributing to the statewide effort to increase the number of Michiganders who earn college degrees or other postsecondary educational credentials.

The University was among awardees singled out as leaders in the college-access field as well as partners in the effort to increase the number of Michigan students enrolling in, persisting through and completing postsecondary educational credentials.

Organization officials say 38.4 percent of the state's residents have such credentials, and MCAN aims to increase the proportion to 60 percent by the year 2025.

WMU's efforts toward achieving that goal earned it the Steward Award: Creating College Access Talent. Recipients of the honor have "dramatically contributed to increasing the skills, talent and knowledge of college-access professionals in Michigan."

For more information about the College Access Impact Awards, visit MCAN's website at micollegeaccess.org. ■



CONGRATULATIONS Stephen John & Joseph Barnett

2015 \$10K Lemelson-MIT "Cure it!" Undergraduate Winners!

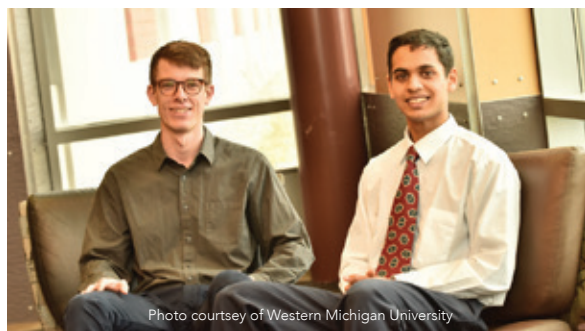


Photo courtesy of Western Michigan University

Joseph Barnett (left) and Stephen John

Stephen and Joseph are enhancing infant health with NeoVent, a respiratory solution for premature infants around the world.

Learn more about these WMU students and their award-winning invention and encourage a current student to apply at lemelson.mit.edu/studentprize.

LEMELSON-MIT

Living longer, better

In view of a world population that is growing older at a rapid rate, this research edition of the *Western Michigan University Magazine* focuses on issues in aging.

Tenho Connable doesn't think of herself as a role model for healthy aging.

However, "I want to be like her in my older years," isn't an uncommon reaction when people hear that this 95-year-old ballroom dancer competes nationally after taking up the sport just six years ago. Though she might not think so herself, Connable might as well be an exemplar for younger peers looking to live long, vital lives.

Her secret?

"From when I was young, I had a good diet. And Finnish people, we do believe in exercise," says the former WMU computer instructor and the widow of the late Al Connable, who once chaired the WMU Board of Trustees.

From her earliest years growing up in Detroit, "there's always been a homestyle exercise in my life, nothing professional.

Just for the fun of it," she says.

Ballroom dancing is her latest pastime, but Connable also danced ballet for 20 years, starting at age 40, as a self-prescribed physical therapy after a leg injury.

"I think that's what has helped me more than anything else in keeping moving."

Tenho Connable is just one example of a long-lived person enjoying what she describes as "reasonable health" in old age, but Americans are living longer than ever, statistics from federal agencies show.

"Life expectancy nearly doubled during the 20th century with a ten-fold increase in the number of Americans age 65 or older," according to the National Institute on Aging.

In 2012, projected average life expectancy in the United States reached a record—78.8 years.

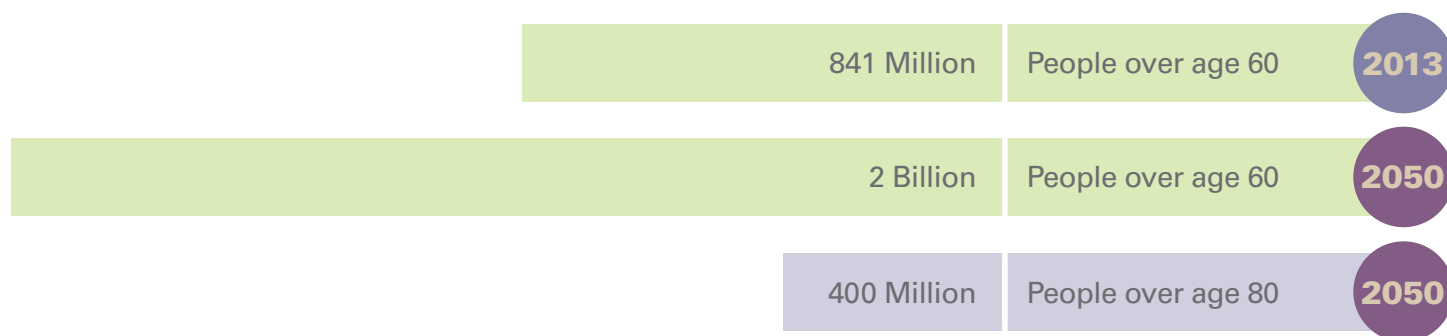
But it's also a global phenomenon.

In 2013, the population of older adults across the globe—those age 60 and older—was 841 million. By 2050, this population is expected to more than double, soaring to 2 billion, according to a United Nations report.

A World Health Organization study projects that, "by 2050 the world will have almost 400 million people age 80 years or older. Never before have the majority of middle-aged adults had living parents."

In view of a world population that is growing older at a rapid rate, this research edition of the *Western Michigan University Magazine* focuses on issues in aging.

Many at WMU are engaged in vital research, education or services related to understanding and meeting the needs of older adults. ■





For fun and for health. Tenho Connable competes in ballroom dance contests yearly, traveling across country with dance pro Erik Yettaw and others from Sharon's Dance Studio in Kalamazoo. And Connable doesn't select easy dances, ballroom dance coach and adjudicator Terry Worrall said minutes after her 95-year-old pupil had rapidly pranced across a studio floor practicing the quickstep on a June afternoon. She lights up on the dance floor.



New WMU service supports seniors who are 'aging in place'



One of Bob Kavelman's latest intellectual interests is Petra, an ancient city in present-day Jordan. At Bob's request, a staff member from WMU's newest Aging Services program brought him library books on the subject.

"Bob just learned about it, and now we all know about it," his wife, Elizabeth, says in jest while her husband laughs with delight.

But thanks to Bob, she can tick off several facts about the old city. And Bob smiles. Together for close to 70 years, they play off each other like this a lot.

Last summer, the Kavelmans were among the first to take advantage of a new in-home care program offered through WMU's Center for Disability Services, a self-funded center that operates under the auspices of the College of Health and Human Services.

WMU caregivers assist the couple with light cleaning, personal hygiene care, trips to the doctor and the supermarket, and with other needs—including getting books from the library sometimes.

These days, 90-year-old Bob needs a magnifying glass to support his voracious reading habit. But the former college administrator and WMU alumnus thinks indulging his intellectual curiosity has kept his mind sharp these decades into retirement.

"I've always done that," Bob says. "I'm interested in a lot of things."

But while their minds remain sharp, they've noticed their bodies increasingly yielding to advanced age.

Elizabeth, 85, had a hip replaced and uses a walker. She also had a fall last year that left her hospitalized for a period. Bob has a long-standing condition—worsening with age—that requires him to use a wheelchair.

"Every year we need more and more help," Elizabeth says.

"Old age is on its way," Bob chimes in, soberly.

"On its way?" Elizabeth says. "I think it's already here!"

Without the weekly help from WMU and other organizations, she adds that "we wouldn't be able to stay in our home."



The new in-home care program the Kavelmans use was a response to seniors who prefer to stay in their homes versus an assisted-living setting, but need help with aspects of daily life, including housekeeping, errands and even socialization.



WMU student Mason Roberts assists the Kavelmans in their home each week, helping with household chores, grocery runs and other tasks.

To serve seniors

Some 30 years ago in the wake of deinstitutionalization, WMU's Center for Disability Services was founded to serve adults with intellectual and developmental disabilities through campus- and community-based programs. The center is funded through Kalamazoo Community Mental Health and Substance Abuse Services, the United Way, fees paid by clients and other sources.

In 2001, CDS was awarded the Michigan Department of Community Health "Long Term Care Innovations" grant. They opened an adult day center for people with Alzheimer's disease and other forms of dementia as well as other conditions that may require supervision throughout the day. Other funders include the Area Agency on Aging, Senior Services of Southwest Michigan and Veterans Affairs.

And last year, to assist seniors such as the Kavelmans who do not have a history of developmental or cognitive disability, CDS added in-home care and care management for seniors, creating its Aging Services division. CDS care management helps seniors coordinate the various types of health and social care they may require.

"Because we have been working with and caring for different populations for years, it was a natural progression to begin to serve the aging population as well," says Kathie Garvey, care coordination manager for Aging Services.

The new in-home care program the Kavelmans use was a response to seniors who prefer to stay in their homes versus an assisted-living setting, but need help with aspects of daily life, including housekeeping, errands and even socialization.

According to the AARP Public Policy Institute, the vast majority of adults want to age in place.

"We all feel better when we are home and in familiar surroundings," says Dr. Carol Sundberg, director of WMU's Unified Clinics and of CDS.

"Our adult day services can help people aging in place because we can support someone during the day so that their caregiver can get a break or go to work,"

74 percent of Americans age 85 and up have difficulty doing daily activities, including housework¹

Age 65 and up households will increase by 11 million in next decade²

81 percent of Americans age 65 and up are homeowners³

“We all feel better when we are home and in familiar surroundings.”

Dr. Carol Sundberg, director of WMU's Unified Clinics and of the Center for Disability Services

Sundberg adds. “Technology can also help someone age in place, by having monitoring devices or sensors in the home that can alert someone that a senior needs assistance.”

Under the supervision of professional staff, many of the individuals who provide the care are WMU students pursuing degrees in allied health and caring professions.

Dawn Robarge, faculty specialist in the College of Health and Human Services and program coordinator for community living services for CDS, says the caliber of student employees sets CDS apart from other providers of the same or similar service.

“These are individuals who want to learn, who want to do a good job, who provide care based on everything they are learning... They’re going to be doctors. They are going to be occupational therapists. These aren’t their jobs, but these experiences are one of the stepping stones toward their careers.”

Music therapy student Mason Roberts spends time with the Kavelmans each week, taking Elizabeth shopping, and completing household chores and other tasks. A vocalist, Roberts connected with the couple immediately when he met them last year because Bob and Elizabeth are musicians.

He’s not using music therapy with the couple—though he has brought his guitar and sang for them—but the experience is giving Roberts more insight for his future profession.

“People who go into music therapy have to have this caring quality about them. The whole reason you’re in the profession is to help,” he says. ■

For more information on CDS Aging Services, go to wmich.edu/agingservices or call (269) 459-8465.

“What’s good for your heart is good for your brain.”

Along with employing outside help to remain in their home of nearly 40 years, the Kavelman’s lifestyle illustrates some best practices in healthy aging. The couple is deliberate about maintaining their physical and mental health in advanced age.

He has limited mobility, but 90-year-old Bob Kavelman has a daily regimen that involves “air force” exercises, stretching exercises and deep breathing.

And though aided by a walker, 85-year-old Elizabeth Kavelman stays on the move, too.

“She’s always motoring around the house,” says Tom Mills who sometimes helps the Kavelmans as a fill-in, but actually supervises WMU Aging Services in-home care staff.

“She’s not fast, but she doesn’t sit down and direct me around. She says, ‘Let’s go do this’ and goes right along with me to do it.”

Research backs up the benefits of staying safely active—for body and brain, says Dr. Janet Hahn, Coordinator of WMU’s Center for Gerontology and an assistant professor of interdisciplinary health programs.

“A lot of people exercise and eat right to ward off heart disease, but it’s also a way to postpone dementia-like symptoms,” Hahn says.

“What’s good for your heart is good for your brain.”

Bob’s habit of taking an interest in and exploring new things is important for mental acuity as well. The couple also likes to play card games together, avidly watch the Detroit Tigers, and the former musicians spend time listening to and discussing music.

“Research has shown, it’s not just keeping your mind active,” Hahn says, “But it’s doing new things and creating new pathways in your brain that are especially beneficial to you.”

Maintaining social engagement is also said to be a healthful habit. Though many of the couple’s close friends and loved ones have passed away, their social network that includes some family, home helpers and, of course, each other, is intact.

“One of the things that has kept lack of socialization at bay is that we’re getting all these (WMU student helpers) that come,” Elizabeth says. ■

Sources: ¹Centers for Medicare and Medicaid Services, ²Joint Center for Housing Studies of Harvard, ³Bureau of Labor Statistics

Music-empowered memory

Can musical exercise help maintain a more youthful mind?

Amid his research into how the brain functions overall when experiencing music, a researcher in WMU's BRAIN Lab is exploring the role music plays in memory.

"It is clearly demonstrated that making music has a profoundly robust response on people," says Ed Roth, professor of music therapy, co-founder of the Brain Research and Interdisciplinary Neurosciences Lab and a fellow with the Academy of Neurologic Music Therapists.

For people suffering from dementia, for instance, music can still evoke memory. Among the last few areas to atrophy in a brain afflicted by forms of dementia, including Alzheimer's disease, are colloquially referred to as the "reward circuitry" situated primarily in the sub cortex of the brain, he says.

This reward circuitry is where the response to food, sex and narcotics occurs, pleasure centers that drive us to seek gratification. Along with the "reward circuitry," parts of the medial auditory cortex are also among the last to degrade.



"As a result, when one listens to music or plays it, it evokes an emotion, an emotion that, in part, has the effect of activating one's autobiographical neuro-network, which causes one to experience memories of who you are (or were), your family, and things you have forgotten," Roth says.

So there is a connection.

But can this

music-induced stimulation be exploited in any way to maintain a more youthful memory in the same way exercise supports physical health?

"What we have learned is that long-term exposure to musical behavior—meaning not just listening to music, but actually engaging in music making—does have several, sort of protective effects on the brain," Roth says.

"You do see changes, not just in the architecture of the brain between musicians and non-musicians, but all sorts of health outcomes, especially related to cognitive functioning.

So you see fewer cases of dementia and Alzheimer's amongst populations of musicians as opposed to non-musicians."

Use it or lose it

It seems music can play a key role in overall cognition and memory.

The good news is that it is never too late to learn, and participating in a community of music makers includes powerful emotional and social motivators which help to lessen the daunting task of learning to play music at any age.

"The brain is very much a 'use it or lose it' organ, and it appears that the more complex the task or stimuli are, the greater the health benefit may be due to the processing requirements related to the tasks and/or stimuli," Roth says.

The brain changes structurally as we attentively complete a task repetitively, Roth explains.

"There is this notion that structural changes to the brain require approximately 10,000 attentive repetitions to produce expert skill in a behavior, such as making music or a specific athletic skill. That is to say, that structural modification of the brain is dependent on the number of attentive repetitions," he says.

So, for example, athletes who repetitively practice free throws or musicians who repetitively practice their musical scales on an instrument actually create new neural systems in the brain that allow them to do the task almost subconsciously.

"They will describe their actions as being in the zone or in the flow," Roth says. "In effect, what the athlete or musician has done is to create new neural systems in their brains which allows them to do the task more efficiently."



"If we look at the musicians brain on an MRI doing this repetitive task, we would not necessarily see the brain 'lighting up'; instead we would see it as being almost deactivated, wherein the brain is so efficient with the task that it has created a system by which to do the task more efficiently."

Get in the flow

Musicians often describe this "muscle memory" and neural network as being in a "flow state" in which they are not playing the music, but are simply the vessel through which it flows.

Roth is interested in understanding the neural footprint of this flow state, which occurs when neural networks are so firmly established that from the musician's standpoint the delivery of the music is effortless.

In collaboration with a colleague at the University of California San Francisco, he is working on a project to understand how this phenomenon occurs. As part of the study, researchers ask young children who do not play musical instruments to improvise musically in arrangement of musical tones in which they cannot play a wrong note. In effect, they just play to play, improvising as they go.

"The neural footprint captured during this back-and-forth musical exchange between the child and the researcher is quite remarkable," Roth says.

"When the study participants improvise music, their brains look like those of someone who is in a verbal dialogue, where the language areas of the brain are activated."

A second finding of the study is that when the participant improvises back and forth with another musician, the parts of the brain associated with empathy become activated.

"These are unskilled, untrained musical novices," Roth emphasizes.

As part of another study, researchers in the BRAIN Lab asked jazz singers to first perform a piece of music as written, and then improvise the piece. Blood was drawn after each singing condition to capture its oxytocin levels. The hormone oxytocin has been linked to feelings of social bonding and trust. Subjects were also tested on a "Flow State Scale" to determine to what extent they experience flow while singing.

Music therapy professor Ed Roth says, "Learning to play or blow the dust off an instrument we may have played years ago—or better yet, make music on instruments that do not need a lot of technical skills—has a profound effect on human function, one of these being memory."



Roth explains that in order to enter into a flow state, there are a series of conditions that must be met, including that a task just slightly exceeds one's current ability.

"Because music is scalable in terms of complexity and difficulty, in many ways, it's the perfect stimulus for social and cognitive functioning," he says.

In a group performance in which people have many different levels of cognitive functioning, Roth says that what—and how—they play can be individualized so each person has the experience of entering into flow.

"The elevated mood-state and increased arousal often give rise to vivid reminiscence experiences. When they occur in a group setting, people report having powerful shared social experiences that reduce feelings of isolation and give group members a sense of belonging through their shared memories," he says. ■

Deliberate measures key to avoiding falls

Most people, youthful and otherwise, will experience a fall during their lifetime. A ruffled rug, an unexpected obstruction, an uncooperative foot and there you are on the ground.

Hopefully, you spring back up, pride perhaps bruised, but body intact. However, the impact of a fall is more likely to be profound for an older adult than for his or her younger counterpart.

Among people age 65 and up, falls are the leading cause of fatal and nonfatal injury, the Centers for Disease Control and Prevention reports.

Dr. Carla Chase, an associate professor of occupational therapy, researches home modification and fall prevention among older adults.

Chase says that along with actions as simple as changing how the contents of your home are arranged, reducing furniture clutter, and staying as physically fit as possible can reduce fall risk or at least mitigate the degree of injury when a fall occurs.

"As we age, our bodies change and may generally lose strength and slow down a bit, but you still need a good cardiovascular and vestibular system," she says. "The cardiovascular system can provide you with the stamina to shift or move after a fall, but more importantly, it develops and maintains healthy lungs. After a fall, one big concern is pneumonia, so healthy lungs are key in combating this."

Meanwhile, the vestibular system contributes to one's sense of balance.

Generally, as children, we fluidly twirl, crawl, roll and move with ease from side to side without much thought. But as we age, Chase says we tend to move primarily on a linear plane, up and down, and we also sit a lot—those long days working or learning at a desk or something similarly sedentary.

The goal of maintaining the vestibular system—along with maintaining leg and ankle strength—is to keep your reaction time shorter so you can respond quickly to prevent a near fall and to decrease the chance of dizziness during fast movements.

"Keeping yourself physically fit, as flexible as possible, and working on not just moving laterally are all keys so that when we do fall, we are in a better position to recover," she says.

And consider your home environment. She says that, "everyone should think about ways they can minimize triggers, even younger individuals in their early 50s and 60s."

A furniture arrangement that you deftly traversed for years may no longer be sensible if you notice you no longer move around it with the fluidity you once did. Rugs may need to be tacked down. And Chase suggests it's never too early to add balance helpers such as grab bars in and around showers and tubs, and hand rails elsewhere.

"Today, there are so many options of attractive grab bars that fit in seamlessly with home décor while increasing the safety for all who visit or live in the home," she says.

Thinking about downsizing to new digs in your elder years? When house hunting, scrutinize how bathrooms are configured, the number of steps into a house and the number of hand railings, and whether the overall layout will meet your mobility needs over time.

It may seem counterintuitive, but Chase also stresses continuing to take part in the activities you enjoy as part of being proactive in preventing falls. After a fall injury, sometimes the fear of it happening again can cause

one to withdraw. The specter of falling starts to make a person less mobile.

"If an older adult's home starts to be less clean or it takes them longer to get the mail or newspaper or take out the trash, they may be afraid. They're starting to feel a little more vulnerable. Family members can look for those signs, and look for bruising," she says.

Determine whether the decrease in activity level is caused by the fear of falling versus from pain. However, "if it really is a behavioral change, you can start to recognize 'oh, maybe there is this fear cycle that my loved one is in.'"

Chase says that pursuing hobbies and being involved in your community can help you or your loved one break out of or avoid a cycle of falling.

"As occupational therapists, that's our big focus—keeping people engaged in their community, their homes, their families," she says. ■



In 2013, the direct medical costs of falls, adjusted for inflation, were \$34 billion, according to the Centers for Disease Control and Prevention.

Working in your golden years?

Does your workspace “fit” for your long-term health?

Ergonomics | *ergenämiks* | The study of the relationship between people and their environment.

The American workforce is graying as many need or want to work beyond traditional retirement age.

By 2022, some 32 percent of Americans between the ages of 65 and 74 will still be on the job, according to U.S. Bureau of Labor Statistics projections. That would be up from 26.8 percent in 2012 and 20.4 percent in 2002.

Given that so many are working longer, it's increasingly important that the work space “fit” the worker for the long-term, says Dr. Debra Lindstrom, a professor of occupational therapy and expert in ergonomics.

In her work as a researcher and consultant, Lindstrom determines how much intervention and assistance people need to create a well-balanced relationship between what they need their body to do at work and avoiding harm as a result of doing it.

She says that a poorly designed workspace can lead to neck pain, shoulder/upper arm pain, forearm tendonitis, carpal tunnel syndrome, cubital tunnel syndrome and low-back pain.

The researcher says that her thoughts on workspace design have evolved over the years. She used to, for instance, advocate for the “best chair possible” for people who have desk jobs.

“However, as I have learned more about sedentary physiology and the negative effects of any prolonged sitting, I’m starting to think of the chair as a place to rest and do the things that you can’t do standing up,” she says.

“I am not an advocate of expensive standing workstations, but I do

recommend that workers move around at least every 30 to 45 minutes, so even if the chair is not “perfect,” they can minimize problems caused by inactivity.”

This hits on one of Lindstrom’s top suggestions—being self-aware when it is so easy to slip into auto pilot mode with regard to how one’s body feels, and even to ignore pain, while working.

“I have found that many people do not realize that they are uncomfortable until they think about it, which they rarely do,” she says. “If you pay attention to how your body is feeling, you can often make changes to feel better as you work and go about daily life, improving your body’s performance and lifespan.”

As noted, the big no-no is sitting or remaining in one position for prolonged periods of time. That goes for people working at a desk or in other settings.

“If you need to do several sitting tasks and several standing/moving tasks, intersperse those tasks so that you aren’t sitting too long or standing/moving too long at any one time,” she says.

Change where you place the printer so that you need to get up to retrieve a document. Switch up the hand that moves the computer mouse to guard against overusing one hand or the other. Same thing for which hand and shoulder cradles the telephone.

She says a “hidden problem” in the modern workspace that may be of particular relevance for older eyes is the role progressive lenses play in neck strain when peering at a computer.

“I wear progressive lenses, and as I read more about visual ergonomics and neck pain, I realized that every time I was

working on the computer, my chin was up in the air so I could read the screen with the magnification part of my progressive lenses,” Lindstrom says.

She and an optometrist came to the conclusion that she needed “reverse progressive,” or progressive addition, lenses for computer work.

“Overall as workers, we can try to figure out what doesn’t seem right between our body and our workstations, and then figure out if there are changes to improve the fit,” Lindstrom says. ■

Some tips for desk workers:

- Place your computer directly in front of your face, arm’s length away.
- Monitor height should allow you to see the top 1/3 of the screen when you look straight ahead.
- Adjust the font size or distance of the monitor from your eyes to avoid tilting your head to see the screen better.
- Move the phone to your non-dominant side, but within arm’s reach.
- If your chair has arm rests, take the time to find a position that feels most comfortable. Use them if they make your arms feel better.
- Ensure your wrists are straight when using your keyboard. If you use a keyboard support, ensure it supports the pads of your palms.
- Adjust your chair to fit you as well as you can. Check its back support.



“We’re going to a senior center! I haven’t been this excited since I left home for college. The little mailboxes are just like the ones we had in the dorm.”

Ruth Beall Heinig, WMU professor emerita of communication, a co-founder of the Osher Life Long Learning Institute at WMU and a youth drama educator.

Retirement-community living

Most adults prefer to “age in place,” according to the AARP. But failing health, a too-large empty nest or widowhood are among reasons some relocate to senior housing if they can afford to. Psychologically and otherwise, it can be a difficult transition. Not so for one 79-year-old retired professor. For her, the recent move recalled the excitement of freshman year.

By Ruth Beall Heinig

The Irish playwright Sean O’Casey observed, “All the world’s a stage, and most of us are desperately unrehearsed.”

How true, I thought, as my husband Ed and I faced a crossroad in our lives. Our home of 40 years, manageable in our salad days, had become a worrisome burden. Limited driving abilities and health issues compromised our previously active lifestyle. Without children or close relatives to rely on, no script in hand, no director to stage or prompter to cue, we had to resort to an improvised drama.

How should we begin? A cousin sells her home to travel the country in an RV, but romantic wanderlust isn’t our style. An apartment would simplify life, but probably be an interim solution. We finally choose a retirement community with independent living and later, assisted living or full-time care if needed.

The plot continues as we downsize possessions. Even though I’d be content living with bare necessities in a monk-like cell, that’s too drastic for Ed. So I ask what he wants to keep. Everything. Where’ll we put it? You’ll find a place.

The comedian George Carlin defines a house as “a pile of your stuff with a cover on it.” And we soon learn that one person’s “stuff” isn’t always another’s treasure. “Lovely, but it won’t sell,” the resale store manager states knowingly. Eventually we sell a few furnishings and donate the rest. A tax break softens the blow.

As moving day nears, I tell anyone who’ll listen, “We’re going to a senior center! I haven’t been this excited since I left home for college. The little mailboxes are just like the ones we had in the dorm.” Clearly, some listeners think I’m either naïve or daft. Shouldn’t this move be a downer rather than a cause for celebration?

“I wouldn’t want to live with old people,” a colleague says half-jokingly, acknowledging his own advanced age. I counter by describing a few residents. One neighbor, a mid-80s world traveler, drives 500 miles to Canada, spending the summer

kayaking at a lake cottage. A 90-plus resident wins ballroom-dancing competitions. The professional head of our resident library recently turned 99. Another resident continues to work each day at his business and his wife, a pilot, travels the country air racing. This is “old?” “I’m ashamed,” my colleague says, subdued. Touché!

Another friend grumbles, “I wouldn’t want to socialize with so many people every day.” Isn’t he aware that socialization is as crucial as diet and exercise for maintaining emotional, physical and mental health? But I must respect others’ choices in playing their own dramas.

Language affects our attitudes. I loathe the term “senior moment” and prefer to say instead, “I’m downloading.” “Aging,” unless it refers to fine wine, sounds disparaging. After all, every living thing ages from inception onwards. So why do we say “aging parents” and not “aging children?” To those who desperately fight against fading youth, I offer Snoopy’s philosophy, “The secret of life is to look good at a distance.”

While it’s true that many residents in our community move at a slower pace and endure debilitating challenges, most are remarkably cheerful and outgoing. “Welcome home; we’re glad you’re here,” they say, sometimes with a hug. One memorable gentleman we were honored to meet faced his end of life with inspiring optimism and equanimity, savoring each morsel of every moment.

These role models are quickly becoming like family. They, as well as the activities and events available to us, including a modern wellness facility and a wealth of educational pursuits, give us a rich existence. Ed says we have hit the reset button toward a satisfying denouement.

A flowery card arrives on my 79th birthday with the greeting: “Some might say we’re going to pot, but I say we’re just learning how to bloom.” My sentiments exactly. ■

A portrait of Sandra Glista, a woman with short blonde hair and glasses, wearing a light-colored cardigan over a dark top. She is smiling and has her arms crossed. The background is a blue and white geometric pattern.

Sandra Glista, a legacy promoting the needs

Sandra Glista stands as a role model for speech-language pathology students at WMU learning to assess and treat people, particularly older adults, who are regaining their communication skills following strokes and traumatic brain injuries.

Though the heart of Glista's 40-year career has been to understand how all people recover their ability to use language after surviving damage to the brain, during her tenure she's been instrumental in promoting the importance of educating students in the treatment needs of older adults.

A speech-language master faculty specialist, Glista was first drawn to the field after completing undergraduate work in psychology.

"I was interested in brain behavior and its impact on communication... I wanted to work with people who have aphasia," she says.

Aphasia is a communication disorder that results from damage to the parts of the brain that contain language, typically in the left half of the brain. Aphasia may cause difficulties in speaking, listening, reading and writing, but does not affect intelligence.

When Glista came to WMU in the late 1970s, the speech-language pathology field was in growth mode, increasing in stature and in the number of practitioners.

More people were surviving strokes and traumatic brain injuries due to advancements in emergency medicine. And that led to a growing number of individuals in need of therapy to recover their communication skills, including to regain speech, understand its meaning or to learn to use assistive devices.

There was a burgeoning appreciation for the expertise speech-language professionals brought to the treatment of stroke and brain injury survivors.

Project KEEP

In 1995, the U.S. Department of Health and Human Services awarded Glista \$200,000 for a personnel preparation training project, Project KEEP—Keep Elders Communicating.

While WMU had won several grants to train speech-language pathology graduate students on how to work with children, Glista recognized the need for developing a concentration directed toward students wishing to work with older adults, especially adults surviving strokes and brain injury.

"At the same time," Glista says, "students need to learn not only about older adults with disorders, but to also think about the person aging well and who is healthy, but who might be at risk for hearing loss or other changes in communication that are more age-related."

of older adults with communication problems

“So Project KEEP’s goals were to develop curriculum and programs to teach our graduate students, to learn more about the typically aging person, learn more about treating those with aphasia, learn about other team members that they’d work with in rehabilitation or in a community, and think about and carry out prevention projects that would promote good communication among people who were aging.”

Project KEEP was instrumental in creating an “infusion model” curriculum, which restructures content to improve student thinking and enhance content learning. A parallel goal of Project KEEP was to instill in the young clinicians an appreciation of the health concerns facing an aging population.

“From Project KEEP, we learned the need to be in an interdisciplinary arena,” says Glista. “We called stakeholders together from WMU and (Kalamazoo Valley Community College) to brainstorm what community providers wanted our graduates to know about serving the aging population. As a result, Project AGE—Alliance for Gerontology Education—was born.”

Project AGE was another personnel preparation project also funded by the U.S. Department of Health and Human Services.

Project AGE mirrored what was done in Project KEEP, but with a focus on a team approach to meeting the needs of the aging population.

Project AGE focused on teams of health care providers, of which speech-language pathology was one. The goal was to identify what needed to be learned about the aging population that wasn’t discipline specific.

“Thus, the curriculum was an infusion model that included cross-disciplinary modules that were, for example, focused on being culturally sensitive, using age-appropriate educational materials and communication relevant to prevention and wellness promotion, all within the context of the interdisciplinary health care team,” Glista explains.

She co-led Project AGE with Dr. Majia Petersons, professor emerita from the Department of Family and Consumer Sciences. They pulled together cross-disciplinary teams of faculty and students from dietetics, occupational therapy, audiology, speech-language pathology, nursing, dental hygiene, social work, health education, and blindness and low vision studies to learn how to contribute to the welfare of the aging person.

Project AGE grew to become Virtual AGE, an online iteration of its predecessors. Led by Dr. Donna Weinreich in the School of Social Work, Virtual AGE brought together professionals and teachers from these same disciplines in a virtual environment.

Coming full circle

In 2001, after having an impact in teaching a new generation of practitioners to be interdisciplinary in approach and skills, Glista returned to her work on aphasia.

“We as a nation were experiencing a shift as we saw the population aging and as more people were surviving traumatic brain injuries,” says Glista. “The question became how to offer those with brain injury resources and support as they returned to their lives.”

The World Health Organization led the way when it called upon speech-language pathologists and other health care professionals to look beyond impairment to recognize that people with disabilities need to re-engage in activities they used to engage in. This method of treatment is called the Life Participation Approach to Aphasia—LPAA.

WMU’s Charles Van Riper Language, Speech and Hearing Clinic uses this approach in its Aphasia Communication Enhancement Program. This program offers group, individual and interest-based therapy provided by graduate students who are supervised by a team of certified speech-language pathology clinical supervisors.

In individual and group therapies, “we listen to each person with aphasia and their family members to see what they want to achieve, and then we apply and adapt speech-language therapy to help them reach those goals,” Glista says.

She says the LPAA is an essential service approach positively impacting how a person with aphasia navigates their environment, life situations, personal identity, attitude and feelings, in addition to their language impairment.

Glista is eager to continue this work with yet another generation of speech-language pathology students who are learning to apply the LPAA to people living with aphasia.

“I love my job because every day I have the opportunity to teach students how to use the most innovative and forward-thinking ideas in our discipline while at the same time working with adults who have aphasia. It’s teamwork at its best.” ■

“Students need to learn not only about older adults with disorders, but to also think about the person aging well and who is healthy, but who might be at risk for hearing loss or other changes in communication that are more age related.”

—Sandra Glista



Screen TO page...

A challenging adjustment for some new readers in the digital age

So you love to read. Do you primarily indulge your habit on a computer of some sort, or do you prefer to eschew the screen for the printed page?

Or, is it sometimes the screen, other times the page?

The literacy pros at WMU's McGinnis Reading Center and Clinic have found that for children who are just learning to read and write—especially for those who struggle—bouncing between mediums can be dispiriting and even impede learning.

"Children do not have the same comprehension abilities or reading strategies an adult possesses," says Deanna Roland, the center's director. As digital natives, "it frustrates them and they find it difficult to switch to a book" that doesn't feature the graphics, flashy images and continuously changing screens to which they are accustomed.

The McGinnis center has a twofold purpose—to help young readers improve their literacy skills and also to give WMU students a clinical experience. Youth who struggle with learning to read and comprehension come to the center for individualized instruction.

Supervised by Roland, undergraduate elementary, early childhood, speech pathology and special education majors as well as graduate students in literacy studies apply strategies based on information they've learned in their WMU coursework for the benefit of aspiring readers.

But the 70-year-old center faces modern-day challenges in its mission to boost literacy skills. As a result of children being bombarded with myriad media these days, accustomed to being entertained by TV, computer games, tablets and phones all day long, WMU staff and students at the reading center have found that it can be a challenge to interest youth in reading.

Many new readers have difficulty making the transition to print materials given their immersion in the world of movies, games, apps, computers, tablets and animation.

"We all need to be intentional about how we use technology," Roland says. "This generation of readers is growing up already exposed to the technology, which in many ways makes it more challenging to engage them in print-based literacies."

Reading from print is one-dimensional and requires many basic and complex skills such as critical thinking, reasoning and inference building, Roland says. Without opportunities to engage these skills or to learn techniques to engage these skills, aspiring readers can struggle.

"We are seeing the results of the rewiring that seems to be happening as a result of the technologies," says Roland. "There is no animation or digital images to help the reader enter the text and that's a challenge for them and for us. Instead, we help them to approach the illustrations, context, vocabulary, letters and sounds to help them make sense of print."

"Students come to us who are predominantly struggling readers who think they don't like to read," Roland says. "Our challenge is to find out from these students what their interests are so we can pull materials and text to build on that interest."

Often times, it's not that the students don't like to read; they need to develop the skills so that they can learn how to read, which helps them to make sense of the world around them. The reading center works with students to teach them how to engage with text at many different levels, whether it begins with decoding, fluency, building background knowledge confidence or motivation.

"When we read from a printed book alongside a developing reader, we can engage them with questions like, 'What do you think will happen next?' or 'What do you think the character would say?'" Roland explains.

These questions invite the reader to make inferences, to enter the story, and to predict how the story should or could evolve.



Roland

Roland also believes in the power of play.

"We are competing with shorter attention spans, so where we can, we try to engage them with content-

specific text that appeals to them,"

Roland says.

For example, when a struggling reader comes into the center, the staff performs an "interest inventory" using the Burke reader inventory. Based on the results, materials and texts are identified that might appeal to the reader.

"So, if we have a student interested in football, we pull a related text for them," says Roland. "That's our hook to invite the student in and motivate him or her."



"Parents can build on this by exposing their children to expository, nonfiction text," says Roland. "Exposing them to different genres will help them grow as readers."

Role modeling how to use technology as a supplemental and different kind of tool versus the primary focus is also important, Roland says. But she's not advocating raising a generation of Luddites.

"Don't misunderstand—technology has a place in reading, say, for example, an audio reading of a book that allows the aspiring reader to follow along with the printed version," she says.

"But even adults need to be intentional about setting boundaries. Where possible, put the phones away, put the tablets aside. Have conversations with your kids."

New literacies and technology are here to stay, she says, but our digital natives need intentional approaches with texts to prepare them for academic success and well-rounded futures. ■



Dr. Ángel Gullón-Rivera studies the power of storytelling, but not as a bibliophile or anthropologist might.

As an expert in child and family development, he has long researched using storytelling to help children improve their social skills.

Gullón-Rivera's latest research involves substantiating the advantages of a method of storytelling called "social stories," in hope of extending to all parents another evidence-based child-rearing tool.

Social stories are the brainchild of Carol Gray who, for years worked with students on the autism spectrum in a Michigan school system, and now leads the Gray Center for Social Learning and Understanding.

Difficulty interacting with others in social situations, and the impaired ability to grasp social cues and the perspectives of others are common features of autism.

Social stories, based on several specific guidelines and criteria, describe a situation, skill or concept to a child with the intention of modeling desirable responses or behaviors versus simply listing dos and don'ts and expecting a child to adhere.

In his research, Gullón-Rivera contends this technique also has significant application for families of children who are having behavioral challenges, and not only those who have autism.

An example of a "concept" social story is one that imparts why children are expected to listen to and obey a parent or teacher, while a "skill" story may teach how to walk in a crowded hallway.

"Most parents and some teachers tend to use the negative—the 'no, no, no' approach rather than explaining the actual behavior that is the desirable behavior," Gullón-Rivera says.

"Instead of telling kids what to do, this approach is to explain the rules. We don't just say what is expected, but the reasons why," he says.

Parents may recognize that this practice directly counters the traditional "don't do that because I said so" method of teaching an expected behavior, but Gullón-Rivera says this other approach is centered on building a child's skill, level of understanding and self-esteem in a positive manner.

So the "social story" that weaves a narrative about traversing a hallway at school might use lines such as: Walking keeps us safe. The teacher is proud when we walk. We keep our hands to ourselves. We use our inside voices. We stay in line.

The stories are written, illustrated and repeatedly read to the child.

"You are describing the expected behavior and reinforcing the significance of it. It's a way to add to their level of understanding," Gullón-Rivera says.

As part of his research, the professor has been working with some Kalamazoo-area parents to create customized, illustrated storybooks to address specific behavioral challenges their children are experiencing.

Each story is based on a child's interests, level of comprehension and reading ability. As part of the research, parents record how their child is behaving prior to being introduced to the story and after being read the story daily for several days.

"The good news is that all the parents have mentioned an improvement," Gullón-Rivera reports.

One family used a social story to guide a child who is strongly curious, but has exposed himself to some potential hazards as a result.

"He likes to explore. He's been exploring by putting things in the toilet. He likes to mix household products," Gullón-Rivera says.

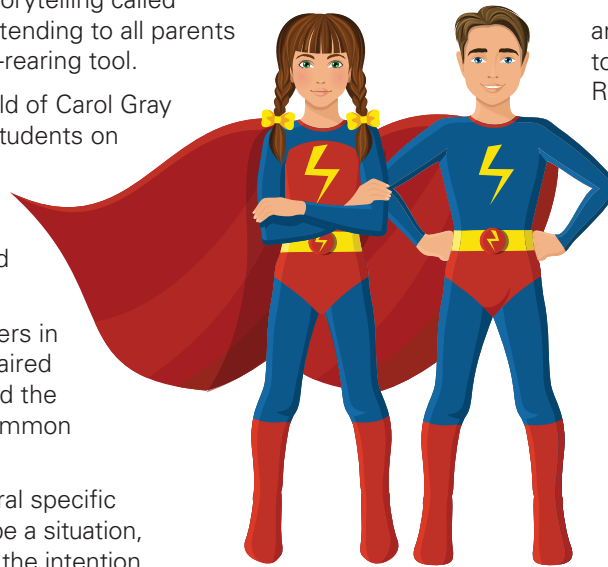
The parents used a social story to help their child set safe boundaries on his exploration without dampening his inquisitive nature.

"So in the story you acknowledge that by nature we are curious and being curious is important to learn and to explore, but there are certain things that may not be safe and when we're not sure, we ask our parents," the researcher says, explaining the gist of the story.

Another family is using this behavior adjustment tool with a child who constantly opposes and argues with his parents. Gullón-Rivera helped the parents develop a story about the ways adults are more knowledgeable than children to explain why adults "make the big decisions."

"The parent shared me with that her son is doing much better. They're reading the story together and he wants to read the story," Gullón-Rivera says.

"The benefit is there. The improvement in social understanding has been proven."



Parenting and the power of storytelling



Parents are not the only storytellers in Dr. Ángel Gullón-Rivera's research; children are also encouraged to develop stories of their own. A child's imagination can provide insight into their inner world, he says. In their narratives are the richness of their perceptions and physical needs.

Revealing tales

Gullón-Rivera says that not only is storytelling a way to help bolster a child's social understanding and promote desirable behavior, but storytelling can give parents and other adults entrée into the "inner world" of a child.

"Young children exude their sense of self-worth through their storytelling, not just their behavior, but through their narrative—how worthy of care, support and protection do I feel? Do I feel loved and accepted?" he says.

As part of his research with the families, the parents are not the only ones telling stories, the children are as well. The child is presented with a number of open-ended scenarios and, using a family of dolls, is asked to act out how family members react to each other.

A child hurts her knee while parents are nearby or soils the carpet with

a spilled drink at dinner or is frightened by a noise at bedtime. What happens next?

"In the narrative is the richness of hearing their perceptions and their physical needs," Gullón-Rivera says.

"Fantasy doesn't come in a vacuum. It's a way to learn any child's perceptions without triggering defense mechanisms. This is a way we can have access to the inner world of the child," he says.

He says the child, as the storyteller, tends to vicariously identify him or herself with their story's protagonist and so, even a tale that is wholly imagined reflects the child's interpretation of aspects of real life events.

"So my approach is that storytelling is a vehicle that parents and teachers can use to learn from the inner world of the child, but also a teaching tool to help the child improve social understanding," Gullón-Rivera says. ■



WMU engineer studying

\$312.6 billion

Heart disease and stroke are among the most widespread and costly health problems facing the nation today.

600,000 people

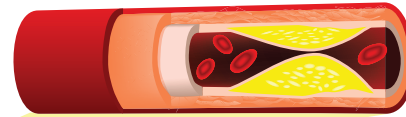
in the U.S. die each year from heart disease, stroke and other cardiovascular diseases.

2,150 Americans

die each day from these heart diseases. More Americans die of heart disease than all cancers.

17.3 million

deaths per year attributed to heart disease, the leading global cause of death.



In the United States, heart disease is the leading cause of death for both men and women, with coronary artery disease as the most common type of heart malady.

A WMU engineering professor has been awarded a \$416,816 grant from the National Institutes of Health to continue his research into understanding the underlying biological mechanisms that lead to heart disease.

Dr. James Springstead, assistant professor of chemical and paper engineering, is the recipient of the unusual NIH grant—the first NIH award ever to WMU’s College of Engineering and Applied Sciences.

He began studying the science behind what leads to blockage inside arterial walls as a postdoctoral researcher at the University of California at Los Angeles. He earned his doctoral degree in chemical engineering at UCLA in 2008.

In the early stages of atherosclerosis, the underlying condition leading to heart attacks and strokes, oxidized LDL—low-density lipoprotein—accumulates inside arterial walls. LDL is known as “the bad cholesterol.”

Springstead’s research is focused on measuring the biological activity of oxidized phospholipids, which have been shown to inflame and eventually form lesions in arterial linings, and more recently, he’s also been studying oxidized fatty acids. Springstead is trying to find the mechanism by which oxidized phospholipids initiate the beginning stages of heart disease.

Here’s what has been determined so far. LDL particles enter the artery through the blood. An overabundance of LDL particles can lead to them getting trapped in the lining of the artery. The LDL particles then become oxidized, stimulating the endothelial cells in the arterial wall. These endothelial cells recruit immune cells known as monocytes, a type of white blood cell, and remove the oxidized lipids and also can become bound up on the arterial wall.

biological mechanisms that lead to heart disease

Several important factors contribute to risk of heart disease, including lipid profile and genetics, in addition to environmental factors, such as diet and smoking.

"When you're younger and haven't eaten too many Big Macs, the process works," Springstead says. "But if you overload the system, you end up with fatty streaks in the arteries. So what we're trying to do is understand the biological pathways of this process."

But Springstead made a surprising discovery. During the synthesis of an important active oxidized phospholipid, PEIPC, he treated the cells in the inner lining of arteries with a fragment of the lipid to test inflammatory signaling. But instead of upregulating inflammatory pathways, he found this oxidized fatty acid strongly inhibited inflammatory pathways.

Furthermore, this oxidized phospholipid is likely to exist in our bodies and has potential to be an important anti-inflammatory mediator in the body. The main focus of this new grant is this oxidized fatty acid, EI.

"As an engineer, I like to look at this beginning process," Springstead says. "The take I'd like to go after, is to try to block initial stages so that the body can take care of itself."

Stents can hold open arteries, Springstead says. But since they are a foreign object, they can cause more inflammation. He likes the idea of choking off the beginning stages.

Springstead always liked chemistry and math, so becoming a chemical engineer was a natural fit. He's excited about continuing his research at WMU because of its new master's program in chemical engineering and the opening of the WMU



Springstead

"When you're younger and haven't eaten too many Big Macs, the process works. But if you overload the system, you end up with fatty streaks in the arteries. So what we're trying to do is understand the biological pathways of this process."

Homer Stryker M.D. School of Medicine. He is scheduled to teach cardiology classes at the medical school this summer.

His project is strengthened by collaborations with Sangderk Lee of the Saha Cardiovascular Research Center of Kentucky, Mete Civelek of the UCLA Atherosclerosis Research Unit, Greg Cavey of the Southwest Michigan Innovation Center, and Walt Shaw of Avanti Polar Lipids.

Springstead has also bought a significant amount of surplus equipment, much of it from pharmaceutical giant Pfizer, refurbished it and added it to his lab to carry out experiments.

"The medical school is already connected with industry and hospitals," he says. "By starting off on the right foot, by starting off with engineering and medicine with a nice bridge between them, I think we can have something really special here and really unique."

Springstead's research ultimately could spark other new and important discoveries.

"There are a lot of different things that could happen," Springstead says. "Hopefully, we could develop or at least be involved in developing the science behind an important drug. Whether this drug would block the immune cell binding to the arterial wall or whether it would be cleaving these oxidized phospholipids, there are a lot of possibilities." ■

NSF grant supports study of contaminants potentially damaging lakes, rivers



A WMU researcher has been awarded a \$284,833 grant from the National Science Foundation to study negatively charged ions that are potentially damaging to lakes and rivers when found in fertilizers and also are a toxic byproduct in waste from manufacturing and mining.

The grant was awarded to Dr. Gellert Mezei, associate professor of chemistry, who has been studying negatively charged ions, also known as anions, for over 10 years.

Mezei's research ultimately could further understanding of how anions can be extracted from industrial and mining waste and removed from enriched bodies of water. Anion removal also has implications for the petroleum, pharmaceutical and nuclear power industries.

Anions (pronounced an-ions) are extremely common, Mezei says. They are often found in water, in the human body and the surrounding environment.

"They are ubiquitous," Mezei says. "They are everywhere in nature. Our body functions are based on several anions that are vital. Many anions are part of minerals. They are necessary ingredients in fertilizers."

But they can also cause big problems.

Anions in the form of sulfates, nitrates, phosphates and chlorides can be extremely damaging in bodies of water and can contaminate lakes, rivers and streams, leading to excessive growth of algae and lake eutrophication.

"So it's important to monitor them and devise ways of reducing their concentration and also eliminate them from contaminated areas," Mezei says. "For example, our own Asylum Lake (in Kalamazoo) has over 10 times more sulfate than what it should normally have. So these anions will lead to excessive growth of algae and ultimately can lead to eutrophication of the lake."

Anions in the form of chlorides from road salt also cause extensive damage to lakes and streams.

"We have these bad winters in Michigan, and we use a lot of sodium chloride,



calcium chloride and other chlorides on the roads, and these end up in our bodies of water," Mezei says. "And then there are the toxic anions."

Toxic anions common in industry and mining in the form of chromate, arsenate, selenate and dozens of other substances, are doubly charged negative ions that have a high affinity for water, are carcinogenic and have been linked to other diseases. In small amounts, they can attack the nervous and reproductive systems, kidneys and blood and cause birth defects. The permissible levels of toxic anions are continuously being lowered as their harmful effects are more fully understood.

Chromium, for example, is used

extensively in industry for plating to produce glittering, sparkling surfaces, common on cars and other products. And nuclear waste contains several toxic anions, which interfere with the disposal process.

"They like to stick to water and stay in water, so that makes their extraction difficult," Mezei says.

That's where Mezei's research comes in.

"In general, the idea for all these different applications is that one or more anions of interest have to be removed," Mezei says. "Unfortunately, it is not that easy to remove one problematic anion from a mixture because many anions are very

similar to each other. Our project hopes to address this issue."

The problem is that not all anions are bad. Removing them all would increase the cost of removal several hundred times.

"These extraction agents we have discovered are very, very efficient in that they bind the anions extremely strongly," Mezei says.

Mezei and his fellow researchers have discovered that the removal agents also show great promise in preventing and even removing scale in the oil industry. Scale is an unwanted substance that builds up in piping and pumping equipment and comes from seawater that is pumped into wells. Production must be halted regularly to scrape it out. Removal agents can be used to extract anions from the seawater before it is used, reducing scale formation, or simply use them to dissolve the scale itself.

"Scale removal can cost the oil industry a million dollars a day," Mezei says. "It's a huge problem."

The NSF grant does not directly fund Mezei's anion extraction research. What it pays for is basic research into how the extraction method works. Why do the extraction agents remove the anions with the highest affinity for water and leave the anions that have a lower affinity for water? The grant project will try to answer that question and help in designing even more effective and selective anion extraction agents.

"We know it works," Mezei says, "but what no one knows is why and how it works." ■

Anions like to stick to water and stay in water, so that makes their extraction difficult.

Dr. Gellert Mezei



Physics student third in WMU history to win NSF graduate research fellowship

A student who recently earned a bachelor's degree in physics from WMU has won a prestigious research fellowship from the National Science Foundation.

Enrique Gamez is one of 2,000 individuals from across the country to win a 2015 NSF Graduate Student Fellowship out of some 16,500 who applied for the program.

The fellowship recognizes outstanding graduate students in NSF-supported science, technology, engineering and mathematics disciplines who are pursuing research-based master's and doctoral degrees.

The fellowship provides three years of financial support within a five-year fellowship period—a \$34,000 annual stipend and \$12,000 cost-of-education allowance to a fellow's graduate institution—for study that leads to a research-based master's or doctoral degree in science or engineering.

This fall, Gamez begins a doctoral program in particle physics at the University of Michigan. He completed his studies at WMU in December.

As a WMU undergraduate, Gamez says that his physics professors created an environment that supported his success and curiosity, even as he began delving into particle physics, a branch of physics in which no current faculty member specializes.

They also included him in their research endeavors.

"The professors are good teachers, very friendly, and eager to help students," Gamez says.

"The community and professors who care about students and care about students succeeding in physics have done a lot for me."

But a Ph.D. in physics is not what Gamez originally envisioned for himself when he began taking community college courses as a K-12 student who was homeschooled. His fascination with manipulating basic elements to create a finished product led him to music.

"I thought I was going to be a composer of music. There weren't any music classes at (Kalamazoo Valley Community College), but there were math classes, so that got me on that track," he says.

After taking several math and science classes at KVCC, Gamez transferred to WMU to major in electrical engineering. However, he was quickly drawn back to classes in the core sciences. Specifically, he enjoyed that physics classes explained "how the world worked at its most basic level."

Gamez was involved in two projects related to his research interests. He worked with Dr. Alan Wuosmaa (now at the University of Connecticut).

He also collaborated with Drs. Asghar Kayani and Paul Pancella in their research using the WMU Van de Graaf Accelerator to measure a type of nuclear reaction.

As someone who felt supported and well-prepared by his own accomplished professors, Gamez is interested in becoming one himself in the future.

"I like the idea of staying in academia," he says. "I think I have the potential to be a pretty decent teacher." ■



Aviator, computer scientist team up to create unique aircraft training app

Two WMU researchers have developed a training app that can be customized to train pilots on—as well as assess their knowledge of—advanced aircraft systems and procedures for modern aircraft. The first aircraft they are completing in the app is the Bombardier CRJ-200 Regional Jet.

Lori J. Brown, associate professor of flight science, and Dr. Ala Al-Fuqaha, computer science professor, won an \$18,531 Technology Development Fund grant from the WMU Research Foundation to develop the app. They expect it to be on the market in the fall, and have had interest from an aircraft manufacturer and an international simulation company.

Accessible on a tablet, cellphone or computer, the training app is intended to bridge the gap between classroom instruction and expensive flight simulators.

“For example, I’m newly hired at an airline and have gone through aircraft system ground training. Prior to the simulator, this would give me the opportunity to learn (an aircraft’s systems and procedures). Tutorials are built in, and it’s mobile,” says Brown, who envisioned the app and teamed up with Al-Fuqaha to create it.

In addition to being an interactive virtual resource for professional pilots learning the control systems of an aircraft that’s new to them, aviation faculty also could use it as one more instructional tool to train their students, Brown says.

The app accurately displays a virtual version of an airplane’s flight deck, and all the various controls are interactive. On the graphical interface, users can push the buttons, flip the switches and move the thrust levers for a total immersive experience to practice or review normal and emergency procedures.

“But what’s most unique is the app-building platform. Instead of being one-size-fits-all, each user can customize it to his or her needs,” Brown says. “This is very important to aircraft manufactures, airlines, simulation companies and training departments with specific training and assessment needs accommodating various aircraft configurations.”

This is where Al-Fuqaha brought his expertise to the collaboration.

The app allows an airline training department, aircraft manufacturer, pilot or an aviation academic instructor to use a simple programming language to customize the app to create procedures training, assessment and recurring training opportunities.

“As I listened to Lori, I realized there was a need to target different models of airplanes. But we didn’t want to develop an app for every single configuration of aircraft. We’d end up developing so many apps, and that would be time consuming,” Al-Fuqaha explains.

After flight deck design and functionality consultation from Brown and College of Aviation simulator instructor Dennis McFall, Al-Fuqaha, with two graduate students, developed the background programming that is the basis for the simple coding aircraft trainers, instructors and others will use to customize the app to provide hands-on training and assessment. The app can also be paired with 3-D glasses.

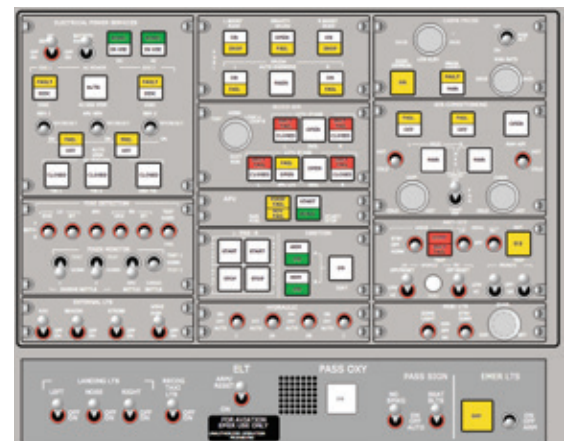
“We delegate the rich capabilities of the app to the users and allow the users to write the apps themselves,” Al-Fuqaha says. “For example, Lori doesn’t know how to program, but she was able to create interactive training scenarios without having to program.”

The researchers plan to submit a patent on the coding that allows this easy customization. They believe this feature can be used to create training apps for other industries and academic applications. ■



“We delegate the rich capabilities of the app to the users and allow the users to write the apps themselves.”

**—Dr. Ala Al-Fuqaha,
computer science professor**



Screenshot of the app's graphical interface

Digitized lighthouse logbooks shed light on 1800s coastal life

Entries run the gamut from mundane observations about the weather or notations about schooners being unloaded to dramatic notations of danger, death or imminent peril.



James Donahue, South Haven, Michigan, lighthouse keeper in the early 1800s

Whether an account of a body washed ashore, a shipwreck in rough waters or an inferno on the mainland, the life and times of lighthouse keepers in South Haven, Michigan, are being brought to a wider audience through the digitization of carefully preserved logbooks by University Libraries.

Called the South Haven Michigan Lighthouse Logs, the new digital collection was created to give a lifelike representation of lighthouse journals spanning the years 1872 to 1880.

The handwritten logbooks have been painstakingly digitized in high-resolution, tagged image file format—TIFF—images, giving as close a representation of the original logbooks as possible.

The project represents one of the first comprehensive digital lighthouse logbook collections to be publicly available online anywhere.

A team of library science professionals added complementary metadata to the collection to aid in searching for or finding online resources to help fill in or complete data required for scholarly research.

The images bring to scholars and history buffs alike the logbook entries of James Donahue, who served as the keeper of the South Haven station for most of the period the digitized logbooks cover.

Donahue took over for an earlier keeper, Capt. William P. Bryan, who completed the first entries. The digital image capture illuminates the daily activities of the light keepers station on South Haven's Lake Michigan shoreline.

The entries run the gamut from mundane observations about the weather or notations about schooners being unloaded to dramatic notations of danger, death or imminent peril.

Take, for example, the first three entries by James Donahue—with the original spellings and punctuation uncorrected—starting in August 1874:

- Aug. 15: The wether plesent wind moderate very warm and smokey a grate many fires in the woods.
- Aug. 19: Woods is afire in all directions grate fears of the town beain burndt up.
- Sept. 1: Steamer Gem Capt. Bryant sunk in the River this evening with sixty three barrels of lime. She was over loaded cargo all lost.

The three logbooks were donated by the Van Buren County Historical Society and have been held in the WMU Archives and Regional History Collections for many years. Library staff put the logbooks on microfilm, but the microfilm copies did not lend themselves to thorough examination of the logbooks in all their complexity, says Dr. Sharon Carlson, director of WMU Archives and Regional History Collections and associate professor of University Libraries.

"We've tried to make the content available and have tried to be very responsible in preserving them," Carlson says. "And now the responsible thing is having a digital copy and making them more accessible to a broader audience."

The lighthouse logbook project comes on the heels of the libraries' recent digitization of Civil War diaries and letters.

Throughout the logbooks, Donahue maintained detailed entries about his daily activities and tasks in the light station. In addition to weather observations, he noted the names of the owners of incoming vessels, lighthouse maintenance, accounts of the commerce and pleasure crafts passing in and out of the harbor and descriptions of shipwrecks, including the name of



Lighthouse keeper log excerpts:

“Rain and cloudy, wind moderate, lake smooth, the night dark, the weather warm—my wife died this afternoon at 4 p.m., of lung disease.” The following day he wrote: “Foggy, wind, the fog thick all day, the lake smooth, the night dark—I berryied my wife to day at 4 p.m.”

the ship and fate to the crew, such as this entry from May 11, 1875: “Thay is a report that the schooner D.G. Wright went ashore in the night and all hands lost twelve miles north of this placed the wind blowed fearfull from half past ten to twelve (midnight).”

Donahue also shared intimate details into the lives of his family and sometimes community members, noting deaths in the community and the occasional body washing ashore. He also mentions the lumber trade and other activities associated with commercial shipping.

The project provides insight into Michigan and maritime history, historical weather observations and a historical record of commerce in what was then a fairly busy port. The logbooks also shine a light

on life in general in the late 1800s in a Midwest coastal community.

Digitizing the logbooks has been an arduous process, according to Paul Howell, University Libraries manager of digitization and systems. The number of man hours required is “in the hundreds for sure” and gave the students involved valuable experience in imaging, transcribing and quality control.

Donahue was born in Vermont in 1842 and enlisted as a private in the U.S. Army in 1861. Wounded at the Battle of James Island, he nearly died, but recovered and went on to fight again. He rose to the rank of captain and was wounded again in the Battle of the Wilderness, resulting in the loss of his leg. Though he only had one leg, he is credited with saving 15 lives, including two of his sons.

Donahue’s lighthouse journals, succinct and to the point, give the impression of a sociable and courageous man dedicated to his duties.

As he writes on July 3, 1875: “Rain and cloudy, wind moderate, lake smooth, the night dark, the weather warm—my wife died this afternoon at 4 p.m., of lung disease.” The following day he wrote, “Foggy, wind, the fog thick all day, the lake smooth, the night dark—I berryied my wife to day at 4 p.m.” ■

To view the collection, visit wmich.edu/library/collections/digital/collections and click on South Haven Michigan Lighthouse Logs.

Physicist melds scientific, humanitarian drive at UN's 'nuclear watchdog' agency



It's fitting that WMU alumnus Dr. Marc Humphrey works as a team leader for the world's so-called "Atoms for Peace" agency, helping to monitor nations' nuclear programs.

This is a man who, after earning a Ph.D. in physics from Harvard University, pursued not a post at a research facility, but a two-year Peace Corps assignment in the West African nation of Mali.

"My unconventional post-doc" is Humphrey's wry description of this turnabout that surprised some of his mentors in physics.

He was just following advice that he would, years later, share with a group of young physics majors at WMU: "Don't narrow your vision."

Today the 1997 WMU graduate lives with his wife and two children in Vienna, Austria, where he heads the analytical services team for the International Atomic Energy Agency's Department of Safeguards. Often in international headlines, of late with regard to Iran's nuclear program, the mission of this United Nations body is to protect the world from the development and proliferation of nuclear weapons.

Humphrey's division analyzes samples inspectors take during inspections at nuclear facilities around the world.

"Specifically, I'm responsible for the logistical aspect of that, getting the samples to Vienna from the field, and then out for analyses conducted across a global network of laboratories," he says.

Though not doing the scientific research he envisioned years ago, his training in physics is vital to this work.

"What we're shipping, it's not potatoes," he says. "These are uranium and plutonium samples. There are very strict rules and calculations you need to do to make sure everything is safe and secure."

As if this hasn't kept him busy enough, he recently renewed some of his WMU ties by publishing two physics books this year with his former professors, Drs. Paul Pancella and Nora Berrah (now head of the University of Connecticut physics department).

Collaborating with his former mentors was a dream come true, Humphrey says, adding, "I wouldn't be where I am today without having had Western."



'Star student'

Twenty years ago, he was one of their brightest undergraduate students. He came to WMU on a Medallion Scholarship, which is among the largest merit-based awards in American higher education.

In those days, the talented undergraduate was convinced a long career in experimental physics was ahead of him, and never would have imagined working for the Peace Corps or the IAEA.

"The thing that distinguished me as an undergrad was the research that I did," he says. "I think it's a lot more common now, but back then it was pretty unusual for an undergraduate to do research. I'm absolutely certain that had I not done that at Western, I would not have had the opportunities that have come down the line."

Berrah says Humphrey was her "star student," and always was the most interested in the material. "I knew he would be at the top of his peers when he graduated. He's tenacious. He doesn't get discouraged," she says.

When Humphrey approached Berrah about working in her lab, for instance, she already had a graduate student and a post-doc researcher to train. Where would she get the funding to support a third person?

"But he didn't even care about being paid. He just wanted to learn," she says. So, as an undergraduate, he co-authored papers with some of his professors and researched alongside Berrah at a national laboratory.

"Back then, I was convinced I was going to win a Nobel Prize," Humphrey says, chuckling. "From early on in my life, I felt like I had something special to contribute and that I just needed to find the right outlet to do so."

This ambition was bolstered at Harvard, where his experimentation involved a cryogenic hydrogen maser, essentially a cryogen-cooled atomic clock—the most stable clock ever built—that he and a team of researchers used to probe subtle collisional effects in hydrogen atoms. While at Harvard, Humphrey also was a NASA graduate student research fellow.

But this is where life circumstances and an open mind can put you in some wholly unexpected and yet wholly perfect-for-you places.

Pursuing the ‘right outlet’

Laboring for so many years in atomic physics, focusing on the elemental aspects of reality, Humphrey felt he was missing out on the wider world and also didn’t feel he was “contributing to society” in a discernible way.

“In physics research, you have to get so focused on one or two problems and get so deep into it that you lose a connection to everything else. It’s part of the greater scientific enterprise, so it’s important. But doing pure science wasn’t enough for me because you’re not making a direct impact on society,” he says.

After graduating from Harvard in 2003 with several awards to his credit, he “recalibrated” by traveling overseas, and took the Peace Corps post. In Mali, he built basic water and sanitation infrastructure for a year and then, as part of his assignment, did some computer programming work for the Centers for Disease Control and Prevention.

Over those two years, he found the Peace Corps slogan to be true—“it really is ‘the toughest job you’ll ever love.’” And though he was directly helping people, as desired, it wasn’t exactly science, his first love. He needed to satisfy an insatiable inkling to marry two inclinations.

Making physics ‘as easy as it gets’

In a pair of new books, WMU alumnus Dr. Marc Humphrey and two of his former physics professors take a notoriously tough-to-grasp subject and break it down for the layperson.

Humphrey enlisted the help of Dr. Paul Pancella, WMU physics professor, and Dr. Nora Berrah, a former WMU professor, to write “Idiot’s Guides: Quantum Physics,” which was published in January. A second book Humphrey co-authored with Pancella, “Idiot’s Guides: Physics,” was released in July.

Hewing to the “Idiot’s Guides” series slogan, “As Easy as it Gets,” the books intend to make physics easy to understand for students and other science enthusiasts.

The “Quantum Physics” guidebook delves into the behavior of matter and energy at the molecular, atomic, nuclear and even smaller levels. The “Physics” book covers the fundamentals of the science,

“In graduate school, I was doing too much science and not enough in the bigger picture benefiting society. In the Peace Corps, I was helping society, but not doing enough science.

“Nuclear nonproliferation seemed like the perfect intersection of the two. And that has turned out to be correct,” he says.

As stepping stones toward his ultimate goal to work for the IAEA, for several years he held key positions at the U.S. departments of State and Energy.

Before being tapped by the IAEA in 2013, Humphrey was the team leader for a division of the Department of Energy that handles nuclear safeguards technology development. He managed more than 35 research and development projects at 12 U.S. national laboratories and oversaw a \$15 million budget.

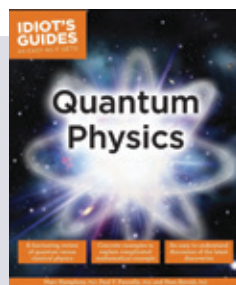
At the IAEA, his work is on a global scale, as he manages a network of 21 analytical laboratories in 12 countries.

“Marc is a key asset to our division and to the IAEA overall,” says Dr. Steven Balsley, head of the agency’s nuclear material laboratory.

“The quality of his work is one of the reasons why the IAEA successfully delivers on its mission to promote the peaceful use of nuclear technology.”

For Humphrey, the work perfectly blends two innate drives—to do science and to do work that he feels appreciably benefits society. He has found his “right outlet.”

He shared that sentiment with physics majors as the speaker at a WMU physics department colloquium last year, saying, “I decided long ago that the most important ingredient to a successful career is finding your dreams and then having the courage—and persistence—to chase them down.” ■



including Newton’s Laws, thermodynamics, mass, energy and work, inertia, velocity, and acceleration.

“Writing the first book with Dr. Berrah and Dr. Pancella, that was really an interesting experience because during my undergrad

years, they were my two mentors,” says Humphrey, now a team leader at the International Atomic Energy Agency in Vienna, Austria.

Though he hadn’t worked with them since the 1990s, he says their reconnection was remarkably easy, especially considering they collaborated remotely across several time zones.

Pancella appreciates the opportunity to help boost scientific literacy among the general public.

“If I can contribute to that in even a small way, I’m interested,” he says. ■



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Photographer and alumnus Joshua Nowicki captured images of these temporary, wind-carved sand formations known as hoodoos on Lake Michigan at Silver Beach in St. Joseph, Michigan, in February. Nowicki, who earned a bachelor's and a master's degree in anthropology from WMU, expanded his passion for photography into a full-time pursuit a few years ago. The Michigan resident's inspiring images have been featured in local and national news outlets.