ARTS AND SCIENCES

Featured in the current issue of Arts and Sciences Magazine: A deep dive into freshwater science and sustainability. WMU researchers are tackling issues that affect global freshwater resources on a daily basis.

PLUS:
Testing the interdunal waters
Battling toxic blooms
Managing water wisely
Michigan’s salty lakes

FACULTY

World-renowned economist Dr. Susan Pozo, professor of economics and director of global and international studies, has been honored as a WMU distinguished scholar.
**ALUMNI**

Three high-profile graduates, including two from the College of Arts and Sciences, received WMU's top alumni honor during Homecoming.

The college also recognized 20 honorees with the Alumni Achievement Award and three with the inaugural Pillar Award.

A physics approach to stroke: Sarah Hulbert George (B.S. '13) uses her WMU training in physics to advance methods of stroke rehabilitation.

Alumnus, storyteller brings American legend to the screen: Bob Hercules (B.A. '79) won a Peabody Award for his documentary on poet, activist and author Maya Angelou.

**STUDENTS**

On Oct. 3, alumni and friends came together to "give gold" to the College of Arts and Sciences for #WMUGivingDay. This resulted in more than $35,000
for scholarships, research and creative activities. From the bottom of our hearts, thank you! Here’s how your gifts help support our students:

A deep dive into freshwater science and sustainability

CONTACT: Molly Goaley

The Great Lakes are the signature of a perfect Michigan summer, and on a hot June day, the ideal location for WMU students to get their feet wet in freshwater science and sustainability research.
Dr. Devin Bloom’s fish biology course has just set sail on Lake Michigan, aboard a schooner chartered by Inland Seas Education Association. Working with the ship’s crew, the students prepare to hoist up a trawl from the deep water off the coast of Suttons Bay. A tangle of green nets splashes onto the deck and spills around them, revealing some interesting creatures.

“People spend a lot of time talking about experiential learning and there’s nothing better than going out and seeing firsthand how the natural world operates,” says Bloom, assistant professor of biological sciences. “I could talk about it all day long in the classroom but what’s going to have the greatest impact and stick with students the longest is seeing organisms in their natural habitat – touching them, feeling them and having that firsthand experience.”

Fieldwork is a key component of freshwater science and sustainability, a joint degree program offered by WMU’s Extended University Programs and Traverse City-based Northwestern Michigan College, and housed within the Institute of the Environment and Sustainability. Launched in 2014, the program integrates scientific research with environmental, social and economic issues, preparing students to address complex challenges concerning the sustainability of freshwater resources.

In addition to the Great Lakes, Michigan’s diverse aquatic ecosystems, including 36,000 miles of streams and more than 11,000 inland lakes, provide the ideal habitat for research and education in water-related issues. Students enrolled in the program have the option of earning an associate’s degree from NMC and seamlessly transferring to WMU-Traverse City to complete a bachelor’s degree, or enrolling in the bachelor’s-only version on WMU’s main campus in Kalamazoo.

One of the nine students in Bloom’s class, Lauren Hucek, started at NMC and will graduate with her bachelor’s degree from Western in December. She is already employed as a fund development and grant specialist with For the Love of Water (FLOW), a Traverse City-based water law and policy nonprofit.

“I took a freshwater science and policy class with Jim Olson (president and founder of FLOW) at NMC,” Hucek says. “It really inspired me to go into the policy side of the program. There are a lot of issues facing the Great Lakes that people might not be aware of, so the educational aspect and increasing water literacy is important to me.”

**SCHOOLED BY FISH**

Aboard the ship, Hucek and her classmates marvel over some exciting fish finds, including two colorful Iowa Darters. But a more concerning discovery is the gobies, quagga mussels and zebra mussels – all species invasive to the Great Lakes – that far outnumber the native organisms in the trawl.

The mussels, for example, are tiny aquatic hitchhikers that accidentally made their way to the Great Lakes from the ballast waters of transoceanic ships. While the students examine and catalogue the organisms, Bloom explains the many ways in which they wreak havoc on the
ecosystem: competing for resources from native species, clogging intake pipes used for irrigation and drinking water, and creating an excess growth of algae at greater depths.

Not only do the invaders damage the aquatic habitat; they come with major consequences to the region’s economy, affecting everything from fisheries to tourism and trade. More than 1.5 million jobs and $62 billion in income are tied to the Great Lakes, which is one reason field experiences on the water are so eye-opening for students.

“The lakes are so inherent to our quality of life in Michigan,” Hucek says. “Water is life. We can’t live without it and we have 20 percent of the world’s surface fresh water right here. Forty million people in the region rely on it for drinking water, and I want to make sure it’s safeguarded for generations to come.”

GREAT THREATS

Invasive species are just one of the many challenges facing the Great Lakes. Students are learning that pollution, climate change and lowering lake levels also pose a serious threat to Michigan’s waterways.

“Most of the challenges come in terms of water quality,” says Dr. Steve Kohler, director of WMU’s Institute of the Environment and Sustainability and professor of biological sciences. “The stuff we’re seeing with Harmful Algal Blooms (HABs), for example, is very reminiscent of things that took place 50 to 60 years ago, but the causes are different.”

Starting in the early 2000s, Lake Erie began to develop HABs, or huge blooms of toxic sludge that make the lake nearly impassible for boats. To make matters worse, the blooms produce contaminants that can cause serious illness in humans and animals.

HABs were severe in the 1960s, once caused by large releases of phosphorous from sewage and industrial plants. The 1972 Clean Water Act and Great Lakes Water Quality Agreement helped reduce the amount of phosphorous coming from these sources and dramatically improved water quality. Today, HABs are primarily a product of excess algal nutrients – phosphorous and nitrogen – from synthetic fertilizers that enter the lake through agricultural and urban runoff.
“The Clean Water Act was very successful in addressing those sorts of problems in the ‘70s,” Kohler says. “We can regulate what is discharged at sewage plants very well but that’s not what’s causing the problem now. Nutrient issues are still a problem throughout the Great Lakes.”

SUSTAINABLE SOLUTIONS

These types of threats are not unique to Michigan. In fact, WMU researchers are tackling a variety of issues that affect global freshwater resources on a daily basis.

One project led by Drs. Mohamed Sultan and Matt Reeves (geological and environmental sciences) is making it possible to forecast and prevent HABs along the Charlotte County, Florida coastline. Another led by Dr. Kathryn Docherty (biological sciences) and Dr. Carla Koretsky (geological and environmental sciences, Arts and Sciences dean) examines roadway salt that enters lakes and influences methane production. Yet another, led by Dr. Gellert Mezei (chemistry), utilizes compounds that can encapsulate toxic ions and purify water. And Dr. Dan Macfarlane (environment and sustainability) specializes in freshwater policy and sustainability issues, particularly the transnational aspects of Canadian-American border waters.

Although sustainable solutions to freshwater management have never been more urgent, Kohler says that WMU faculty and students are driven to address the issues head on. “It’s a challenge and it takes a very large coordinated effort, but people are working on the problems very seriously,” he says. “Students get excited about aquatic research. Once they see what’s actually living in the water, that has an even bigger impact.”

To learn more about WMU researchers' work in freshwater science and sustainability, view the 2018 issue of Arts and Sciences Magazine.

Testing the interdunal waters

Michigan's interdunal wetlands are places of great biodiversity, yet little scientific research exists about these rare habitats. Dr. Tiffany Schriever's Michigan Sea Grant-funded research aims to
understand how aquatic communities found within the wetlands respond to environmental variation. She and her students measure food webs, as well as the identity and abundance of various reptile, amphibian and insect species, to examine their response to natural and human disturbances.

"Coastal wetlands provide essential ecosystem functions maintaining the health of the Great Lakes and offer critical habitat for aquatic biodiversity," says Schriever, assistant professor of biological sciences. "Yet many, if not all, interdunal wetlands are located in Department of Environmental Quality-recognized 'critical dunes areas.'"

Formed within the low-lying spaces between dunes along the Great Lakes and especially prevalent along the eastern Lake Michigan coastline, the interdunal wetlands come and go based on lake water levels. Due to their natural rarity and restricted range, impacts to these areas can be particularly devastating. According to the Michigan Natural Features Inventory, interdunal wetlands are classified as imperiled in the state.

"My work helps to understand the connection between dunes and coastal wetlands, and offers critical insight for the management and conservation of these imperiled habitats," Schriever says.

To conduct her research, Schriever and a team of graduate and undergraduate students spend the summer sampling the wetlands for insects, reptiles and amphibians, surveying the landscape for various species and taking water chemistry and habitat measurements. "Fieldwork is the most rewarding part of the job," Schriever says.

"We bring the insects that we've collected into the laboratory at WMU and identify them to species. We then use the data to assess whether changes in species' composition have occurred over time and at different spatial scales."

Schriever emphasizes that there is still much to be learned from these critical habitats and she plans to continue research in this area for years to come. "My next steps are to determine the factors that regulate aquatic community assembly and use population genetics to determine spatial connectivity among the wetlands," she says. "I find it incredibly rewarding that we discover new things about how the wetlands function and what animals live in them all the time."

To learn more about WMU researchers' work in freshwater science and sustainability, view the [2018 issue of Arts and Sciences Magazine](#).

Battling toxic blooms
Harmful algal blooms (HABs) occur when colonies of algae grow out of control, producing hazardous toxins that threaten humans and aquatic life – and while Michigan has faced numerous HAB events, the problem is not unique to our state’s waterways.

In 2017, a team of WMU students led by Drs. Mohamed Sultan and Matt Reeves launched a research project that examines HABs along the Charlotte County, Florida coastline. Funded in part by the Enterprise Charlotte Foundation, the study aims to: 1) understand the factors and conditions that control the occurrences of the blooms, and 2) develop efficient, cost-effective and automated systems for mapping and predicting them.

“To accomplish these goals, we first extract statistical relationships that relate historical bloom events in Charlotte County and surrounding waters to observations extracted from satellite imagery on bloom days or acquired a few days earlier,” Sultan says. “We then look for similar observations to map and predict bloom occurrences.”

Using the researchers’ methods to forecast and identify the factors controlling HABs could help Charlotte County policymakers implement measures to reduce or mitigate the blooms.

“The beauty and biological productivity of Charlotte Harbor, such as fishing and wildlife, is the primary reason people live in this area,” Reeves adds. “Environmental degradation through pollution and eutrophication (algae blooms caused by excess nutrients) could have devastating impacts on the local community, so it’s important to understand the factors that contribute to them.”

Reeves says the HABs in Charlotte County are caused by excess nitrogen entering groundwater through the area’s septic systems. His research focuses on characterizing the flow and transport properties of the surficial aquifer system to better understand nitrogen loading into the harbor.

“The conversion of septic systems to sewers is underway, which will dramatically reduce nitrogen into Charlotte Harbor,” he says. “However, the full septic-to-sewer conversion will take over three decades. Our work on the characterization of ground water velocities and the surficial aquifer system can be used to identify areas within Charlotte County that should receive higher priority for sewer conversion.”
Managing water wisely

As an environmental historian, Dr. Daniel Macfarlane specializes in interdisciplinary freshwater policy and sustainability issues, particularly the transnational aspects of Canadian-American border waters and environmental relations in the Great Lakes-St. Lawrence basin.

Macfarlane, assistant professor of environment and sustainability, aims to create sustainable interactions between the environment and society through his work. “The goal is to arrive at balanced and appropriate regulations, governance and uses of water that allow humanity to thrive without detracting from the rest of the planet’s ability to do the same,” he says. “Freshwater policy in many ways needs to come before other policies, because human society is impossible on even the most basic levels without safe water supplies.”

Macfarlane describes freshwater usage and policy as “ground zero” for the environment, public health and the economy, and says the long-term costs of failing to protect water are much greater than the short-term costs of investing in safe water.

“In places like Michigan, tourism and recreation are obviously tied to clean water, but most industrial developments would be impossible without it,” he says. “All forms of electricity and power generation require copious amounts of water and we can’t grow food without clean water. The automobile industry requires access to water and, locally, Kalamazoo’s paper mill history is inseparable from water.”
With water policy so critical to the health, environment and economy of Michigan and the Great Lakes, Macfarlane notes the dangers of poor regulation and the negative impacts that can result when those policies are flawed. “Public health is an obvious concern. Just look at the Flint water crisis and what is happening with PFAS in southwest Michigan,” he says, referring to the state’s current contamination issues caused by the common chemical substances perfluoroalkyl and polyfluoroalkyl (PFAS).

“These types of issues are under the purview of federal, state and municipal water policies. Given the importance of the transnational Great Lakes to Michigan, international water policies involving Canada also come into play,” he adds. “A thriving economy requires access to safe water, but economic issues of water also run the danger of commodifying, using up or polluting this water.”

To learn more about WMU researchers’ work in freshwater science and sustainability, view the 2018 Arts and Sciences Magazine.

**Michigan's salty lakes**

Michigan uses tons of road salt each year, and while this de-icer helps keep the roadways safe, it also pollutes the natural ecosystem – particularly lakes and other waterways.

Dr. Carla Koretsky, College of Arts and Sciences dean and professor of geological and environmental sciences, and Dr. Kathryn Docherty, associate professor of biological sciences, recently conducted a project funded by Michigan’s Department of Environmental Quality that studies road salt contamination in Kalamazoo-area urban lakes.

“When road salt washes away, it dissolves in water and eventually ends up in the lowest point in a watershed – usually a lake,” Docherty says. The salt disrupts a critical process known as turnover. “Normally, as temperatures change during spring and fall, water from the top of the lake sinks to the bottom, carrying dissolved oxygen with it. This is the reason why animals such as fish and insects can survive at the bottom of the lake in winter.”
When road salt enters the lake, it can fail to mix seasonally, causing the bottom to remain deprived of oxygen. “Lakes impacted by road salt create the perfect habitats for anaerobic microorganisms, some of which ‘breathe’ in chemicals like hydrogen and carbon dioxide and produce methane,” Docherty says. “If these lakes are producing more methane, then we could be underestimating their importance as methane sources in models that predict the effects of climate change.”

Road salt contamination also comes with major consequences for recreational fishing. “Once the salt is dissolved, it’s virtually impossible to remove,” Docherty says. “As lakes continue to receive salt inputs, the lack of turnover will limit deep-water oxygen for fish during the winter. As a result, lakes may not be able to sustain fish populations year-round.”

While Docherty says much research is needed in order to better understand the impacts of road salt contamination, she hopes to see more regulation of its application, as well as alternative forms of de-icers. “There are many ways to move forward with this research,” she says. “It will be interesting to see whether we can include urban lake methane production into climate change models.”

To learn more about WMU researchers’ work in freshwater science and sustainability, view the 2018 issue of Arts and Sciences Magazine.

World-renowned economist to receive distinguished scholar award

CONTACT: JEANNE BARON
SEPTEMBER 4, 2018 | WMU NEWS

KALAMAZOO, Mich.—A veteran researcher known for being the first to study real-world topics that later became front and center in national policy discussions will be honored by Western Michigan University as a distinguished scholar.

Dr. Susan Pozo, professor of economics, will receive the Distinguished Faculty Scholar Award during WMU’s Fall Convocation activities at 11 a.m. Friday, Sept. 14, in the Bernhard Center.

The event will feature WMU President Edward Montgomery's State of the University address as well as the presentation of four other sets of annual campuswide awards: the Emerging Scholar, Distinguished Teaching, Distinguished Service and Annual Make a Difference awards. It is part of daylong convocation activities that start at 8:30 a.m.

DISTINGUISHED FACULTY SCHOLAR AWARD

Established in 1978, the Distinguished Faculty Scholar Award is the highest annual honor WMU bestows on faculty members. The award program recognizes those whose work constitutes a
significant body of achievement, largely while a faculty member at WMU, that is widely recognized within the national and international academic communities.

POZO'S RESEARCH

Dr. Susan Pozo

Pozo is a professor of economics and directs WMU's global and international studies program. A faculty member since 1982, she is a prominent and prolific researcher who is internationally recognized and highly respected in policy as well as academic circles.

She focuses her research on a variety of topics, including immigration policy, refugees, undocumented migration, returns to international human capital, empirical distribution of foreign exchange rates and measures of exchange risk, and underground financial and economic activity.

Pozo's research portfolio includes 61 refereed journal articles, 11 book chapters, four edited books and one sole-authored book.

"She publishes in the top journals of our profession, and her published research is cited extensively by other researchers," a WMU colleague nominating her wrote. "This is remarkable evidence of the broad respect for the quality of her research and the contribution of her research to important societal issues."

Many nominators credited Pozo for the relevance of her research and being the first person to study topics such as remittances (monetary transfers between immigrants and the family left behind) and the consequences of immigration enforcement and immigration policies, topics that now are continually discussed in development policy circles and journals.

"Susan Pozo is an incredibly passionate and productive researcher whose body of work has shed light on real-world issues that affect our communities every day," a University of Arizona nominator wrote. "With solid data and methodology, she has been relentless in posing questions and pursuing answers that affect the most vulnerable among us."

ADDITIONAL ACTIVITIES
Pozo serves as referee for numerous prestigious journals, reviews grant applications for several government agencies and is invited to present her research at premiere conferences. She is president of the American Society of Hispanic Economists and since 2014, has been a research fellow of the Institute for the Study of Labor in Bonn, Germany. While at WMU, she also has served stints as a Fulbright Research Scholar in Montevideo, Uruguay, as well as a visiting fellow at the University of Oxford in the United Kingdom, a visiting researcher at the University of Salamanca in Spain and a visiting scholar at the University of Montevideo.

A common theme in the award nominations Pozo received is her willingness to conduct research in a collaborative way and to actively mentor young researchers, often teaming with them on important studies and articles.

"A final and long-lasting aspect of Susan's academic work is her contribution to the formation of a new generation of academic economists working on migration," wrote one nominator she mentored who now works at the University of Oxford. "My experience having her as a dissertation advisor at WMU was excellent, and I have heard similar feedback from other former students. The formation of these economists amplifies substantially the reach and recognition of WMU at an international level."

Pozo earned a bachelor's degree in economics from Barnard College of Columbia University in 1976 and a doctoral degree in economics from Michigan State University in 1980.

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Three high-profile graduates to receive WMU's top alumni honor

CONTACT: JEANNE BARON
SEPTEMBER 27, 2018 | WMU NEWS

KALAMAZOO, Mich.—Leaders in business, broadcasting and biological sciences next month will receive Western Michigan University's Distinguished Alumni Award--the highest honor WMU can confer on its graduates.
The 2018 award recipients are Ed Gordon, an Emmy award-winning journalist and radio and TV host; Carrie Jones-Barber, CEO of Dawn Foods; and Dr. James Olson, an innovative scientist who researches brain cancer in children.

DISTINGUISHED ALUMNI AWARD

Established in 1963, the Distinguished Alumni Award program honors and celebrates graduates who bring distinction to their alma mater through professional accomplishments and who have achieved a high level of success in their careers. They are nominated by their peers and selected by the WMU Alumni Association Board of Directors.

The University's 55th Distinguished Alumni Award recipients will be recognized during the WMU Night of Excellence, a new gala-style reception that will serve as the University's signature event for recognizing its alumni and will celebrate select groups of graduates from all of the University's colleges.

The event will be held from 6 to 9 p.m. Friday, Oct. 5, on campus in University Arena and include a reception, entertainment and dinner. Early registrations for the event are due Friday, Sept. 28. For information about registering and complete bios of the Distinguished Alumni Award winners, visit the award program's website.

ED GORDON

Gordon, who resides in Oakland County, graduated with a Bachelor of Arts in communication from WMU in 1982. He is president of Ed Gordon Media, a multi-service production company, and an active broadcaster. He is the host and executive producer of "Ed Gordon," an hourlong quarterly news magazine on Bounce TV, as well as host of the nationally syndicated radio program "Weekend with Ed Gordon."
Additionally, he can be heard on "The Steve Harvey Morning Show" and he delivers "Right Now" with Ed Gordon, daily commentaries for radio stations across the country. He also has been a correspondent for "60 Minutes" at CBS, led "News and Notes with Ed Gordon" on NPR, and was a contributor for NBC’s "Today Show" and "Dateline."

Over the course of his career, Gordon has developed into a news powerhouse. He initially earned distinction during two stints with the BET cable TV channel, where he filled numerous roles while helping to cement the station's news programming. These roles included serving as host of "BET Tonight," anchor for "BET News" and the creator of his signature series, "Conversations with Ed Gordon."

He is known for pressing hardline issues that revolve around the overlooked and underrepresented and for bringing viewers and listeners face to face with controversial figures and shining a light on their stories. In 1996, for instance, Gordon became the first person to interview O.J. Simpson after his famous acquittal, which earned him a three-year stint at NBC-TV.

Additionally, he has interviewed many well-known figures. The list includes presidents Barack Obama and Bill Clinton, Nelson Mandela, Desmond Tutu, and celebrities such as Denzel Washington, Oprah Winfrey, Beyonce and Michael Jackson.

CARRIE JONES-BARBER

Jones-Barber, who resides in Ann Arbor, graduated with a Bachelor of Business Administration in management from WMU in 1982. After a short stint in medical sales, she joined Dawn Foods in a sales role in 1985 and climbed the ranks before being named CEO in 2006. Jones-Barber previously also served as president of Dawn Foods International, business development manager at Dawn Foods UK Ltd. and chief information officer.
One of the world's premier bakery companies, Dawn Foods produces more than 4,000 products, employs nearly 5,000 people and does business in more than 105 countries. The company supplies a complete line of mixes, bases, icings, glazes, fillings, frozen dough, par-baked and fully baked products, and equipment to the food industry worldwide.

During her tenure at Dawn, Jones-Barber has focused on growing the company internationally and introducing significant organizational changes, including global strategic planning processes and change management best practices.

Her leadership also has placed an emphasis on social responsibility and sustainability, as demonstrated through initiatives that reduce greenhouse gas emissions, promote greener packaging, support literacy and art programs, work on the prevention of hunger, and provide vocational baking opportunities. Additionally, the Dawn Foundation has had a wide impact on the communities it serves.

DR. JAMES OLSON

Olson, who resides in Seattle, graduated with a Bachelor of Science degree in biomedical sciences from WMU in 1984. He is the principal investigator at the Olson Laboratory and a member of the Clinical Research Division at the Fred Hutchinson Cancer Research Center in Seattle. He also serves as a professor of pediatric hematology and oncology at the University of Washington School of Medicine and is an attending physician at the Seattle Children's Hospital and Regional Medical Center.

His work prioritizes and advances therapeutics into clinical trials for children with brain cancer, with increasing focus on types of brain tumors that are uncommon and have the greatest need for research. The Olson Laboratory intends to increase the cure rate for children with these types of brain cancer by at least 10 percent. It also aims through state-of-the-art DNA sequencing to discover why and how tumors become resistant to drugs.

One of his more notable breakthroughs literally lights up cancer cells and helps to improve tumor removal. In 2013, he launched along with colleagues Project Violet, a citizen-based crowd-
funding initiative to develop a new class of anti-cancer compounds derived from chemical templates from organisms such as violets, scorpions and sunflowers.

Olson and his team of researchers developed Tumor Paint, a drug that acts like a paint, attaching to tumor cells and illuminating them so that surgeons can easily remove an entire tumor without causing damage. Additionally, they are developing a new class of anti-cancer compounds known as optides, with the goal of creating therapies that do not destroy healthy tissue, only cancerous cells.

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2018 Alumni Achievement Awards

The College of Arts and Sciences at Western Michigan University is proud to announce the 2018 Alumni Achievement Award winners and to celebrate the outstanding contributions made by these 20 influential alumni. They were recognized at our Alumni Achievement Awards reception on Friday, Oct. 5.

DEPARTMENTAL AWARDS

Susan Reichert, MA ’16, Quality Program Manager, Kellogg North America Snacks Research and Development
Department of Anthropology
Dr. Gary J. Pierce, MA '74 (Posthumously), Botanist and Wetland Scientist
Department of Biological Sciences

Dr. Jack J. Manis, BS '70, Retired Pharmaceutical Research Scientist and Manager, Pfizer, Inc.
Department of Chemistry

Michael Steele, BS '74, President and Chief Executive Officer, Advantage Communications, Inc.
School of Communication

Dr. Dustin J. Byrd, BA '00, MA '06, Associate Professor of Religion, Philosophy and Arabic,
Olivet College
Department of Comparative Religion
Emily Kastner, BA '05, Children's Author, Illustrator; Co-founder, Read and Write Kalamazoo
Department of English

Dr. Roger C. Steininger, BS '64, Consulting Geologist, Steininger Consulting
Department of Geological and Environmental Sciences

Diana R. Bergwin, BA '06, Staff Director, Oversight and Management Efficiency Subcommittee, US House of Representatives Committee on Homeland Security
Global and International Studies program

Alan Holck, BA '68, Vice President, Wells Fargo Insurance, Inc.
Department of History
Dr. Nicholas Scoville, BS '03, MS '05, Joseph Beardwood III Chair of Mathematics, Ursinus College
Department of Mathematics

Mark Rochon, BS '80, Partner, Miller & Chevalier, Washington, DC
Department of Philosophy

Ryan Findlay, BA '04, Chief Executive Officer, American Soybean Association
Department of Political Science

Dr. Iser "Willie" DeLeon, MA '93, Professor of Psychology, University of Florida
Department of Psychology
Judith Huth, BA '75, MPA '79, Retired Executive Director, Volunteer Kalamazoo School of Public Affairs and Administration

Dr. Kevin Fuchs, MA '02, Foreign Language Faculty, Kalamazoo Valley Community College Department of Spanish

Loren Heun, BS '66, MS '72, Master Faculty Specialist, Western Michigan University Department of Statistics

Sarah J. Murray, BA '09, Associate Director, Office of International Development, Indiana University Department of World Languages and Literatures
PILLAR AWARDS

Discovery Driven

**Dr. William Waller, BS '78, MA '79**, William R. Kenan Jr. Professor of Economics, Hobart and William Smith Colleges
Department of Economics

Globally Engaged

**Dr. Theresa Crimmins, BS '97, MA '99**, Assistant Director, USA Phenology Network;
Associate Research Scientist, University of Arizona
Department of Geography

Learner Centered

**Kathy J. Mirakovits, MS '98**, K-12 Educator, Forensic Science
Mallinson Institute for Science Education

DISTINGUISHED ALUMNI AWARDS
A physics approach to stroke rehabilitation

CONTACT: Molly Goaley

We often hear stories about what happens to the body during a stroke. The sudden loss of oxygen to the brain, the onset of paralysis in the face or limbs, blurred vision and slurred speech, the alarming disorientation and need to seek help. With one out of every six people experiencing a stroke at some point in their lives, a survivor’s personal account can be not only gripping and terrifying, but all too often relatable.

What we hear less of are the stories about what happens after a stroke. For survivors who retain long-term or permanent damage, recovery and rehabilitation can be a grueling process. Imagine
the most automatic tasks becoming impossible to perform, with words and thoughts swimming around somewhere in the mind but never quite making their escape to the surface.

Consider for example the use of a fork: your brain must send a signal for your arm to reach the handle, your hand to close around it, your arm to raise it, your mouth to open, and your arm to move the fork into your mouth. Simple. Except, your arm and hand won’t comply. And when you try to explain this to someone else, you can’t readily recall the name for what you’re eating.

Regaining speech, vision, memory and muscle movement takes a significant toll on the body and mind. While recovering from a stroke comes with small rewards in each daily success, it also comes with frustration, exhaustion and a host of other emotions and physical states when rehabilitative therapies do not go as planned.

To improve treatment, it’s imperative that scientists understand how the brain and body connect during every step of recovery. This is the type of neurophysiological activity WMU physics alumna Sarah Hulbert George B.S. ’13 examines. Specifically, she studies brain activity during movement to identify the unique characteristics that indicate whether a person will execute that movement, such as lifting an arm, well or poorly.

Taking a physics approach to understanding the mysteries of stroke has unique advantages. Because physics extracts the fundamental, underlying information at the root of complex problems, it can offer a new perspective into how the brain functions during and after a stroke.

Hulbert George uses her undergraduate training in physics from WMU to examine the neurological phenomena that control movement, approaching the process like a complicated physics problem. “I did my undergraduate work in physics because I wanted to understand the way things work at the base level,” she says. “In my opinion, physics addresses the questions of how and why better than any other field.”

By the time she was a senior at Western, Hulbert George also realized she wanted her research to impact people first and foremost. She chose to pursue biophysics because it takes the quantitative, rigorous approach of physics and applies it to biological problems. Now a Ph.D. candidate in biophysics at The Ohio State University, Hulbert George employs physics-based principles on a daily basis in her current project, titled “Predicting Your Next Move: Real-Time EEG and Kinematic Analysis Motor Neurorehabilitation and Neurofeedback.”

“I use biophysics to approach my neurophysiological and neurorehabilitative research from a quantitative, objective standpoint,” she says. “The physics of electricity and magnetism are the foundation for electroencephalographic (EEG) and single-unit recording, which are key components of my work.”

Because a big part of Hulbert George’s research involves examining brain activity during movement, she spends a substantial amount of time investigating kinematics – such as position and velocity – which are the basis of mechanics, the branch of physics dealing with the study of motion.
“You can imagine that for a person who has had a stroke and now suffers from poor motor control in one of their arms, as often happens after stroke, they might try some rehabilitation to gain back the lost function,” she says. “This is where my research comes in – if we can identify the features that indicate a person’s quality of movement just before they make the movement, then we can provide them with real-time neurofeedback during their rehabilitation practice.”

Hulbert George collects kinematic and brain signal data by having participants play Recovery Rapids, a video game designed to deliver motor practice for the weaker hand and arm following a stroke. Participants’ body movements are captured by the Microsoft Kinect sensor to power a digital kayak downstream. Meanwhile, Hulbert George and her colleagues use EEG to simultaneously record their brain activity.

“After the session, we process both sets of data and extract the features from EEG signals using machine learning,” Hulbert George says. “Once we extract the features, we can do a correlation analysis to answer questions like, ‘does this feature always, or almost always, show up right before a good movement?’”

If during rehabilitation a person is about to perform a “good quality” movement, Hulbert George can detect the characteristics using EEG and provide visual feedback that sends the message, “great job, keep up the good work.” This type of positive reinforcement, she says, increases the efficiency and quality of therapy for stroke survivors.

By approaching the research from a physics perspective, Hulbert George is uniquely positioned to weed through complex information and find its most revealing details – the neural signatures that indicate the quality of a person’s movement.

“We’re not really sure what we’re looking for in terms of the features themselves,” she says. “The beauty of unsupervised machine learning for feature extraction is that we do not need to know ‘a priori’ what features will come out. Using these methods, we can let the signals themselves tell us what features uniquely characterize them.”

Employing the quantitative rigor of biophysics to reveal how the brain functions after a stroke – and using that knowledge to improve rehabilitative therapy – models what Hulbert George hopes to continue throughout her career. Her ultimate goal, she says, is to help people achieve a better quality of life.

“The most exciting thing about my work goes back to why I turned to biophysics in the first place,” she says. “Because it has the potential to impact people, and not just tangentially, but in a very direct and immediate manner.”

View this story and more in the 2018 issue of WMU’s Arts and Sciences Magazine.

Alumnus, storyteller brings American legend to the screen
Peabody award-winning filmmaker Bob Hercules credits his time at Western for giving him the foundation to tell inspiring stories, including that of prolific poet, activist and author Maya Angelou.

On May 19, acclaimed filmmaker Bob Hercules (B.A. '79) experienced the pinnacle moment of his career when he and his team accepted the 2017 Peabody Award in documentary filmmaking for “Maya Angelou: Still I Rise,” a film about the late poet, essayist, activist and celebrity.

The Peabody Awards, founded in 1940 and once considered the “Pulitzer Prize for radio,” honor the most important stories and storytellers working in television, radio and digital media each year. Recipients must be unanimously chosen by a board of jurors comprised of industry professionals, media scholars, critics and journalists. Hercules, a School of Communication graduate, credits his time at Western for giving him the foundation to tell inspiring stories and developing his creative and political outlook.

TELLING ANGELOU’S STORY

The documentary examines the formation and life of Dr. Maya Angelou, one of America’s foremost voices of political concerns, racial divides and compassion of the late 20th century.

While exploring the idea for the project, Hercules was “shocked” to learn that no one had previously made a film about the prolific figure. “Many people had approached Dr. Angelou with the idea of doing a film and she turned everybody down because of various reasons,” he says.

Through a mutual friend, Hercules was soon introduced to co-producer and co-director Rita Coburn Whack, who had an existing relationship with Angelou and was planning a documentary of her own. The two filmmakers decided to embark on the project as team.
Together with Whack, Hercules was able to build trust with Angelou by explaining that the film was intended for PBS’ “American Masters,” a program for which he had done previous work. He sat down with Angelou to show some of his past films for the series, including “A Good Man” which showcased acclaimed director and choreographer Bill T. Jones’ life. After meeting with the directors, Angelou gave her blessing for them to proceed with the project.

CAPTURING HER LEGACY

In preparing for the documentary, Hercules says he didn’t want to make a “list film” that simply showed accomplishments chronologically. “I wanted to tell stories about her life that would be representative of her whole life,” he says. “I wanted to be able to tell stories at greater depth.”

To achieve a narrative that touches upon the breadth of Angelou’s life, Hercules sought interviews from many of the people she associated with throughout her career, including former President Bill and former presidential candidate Hillary Clinton. Angelou famously recited her poem “On the Pulse of Morning” during President Clinton’s 1993 inauguration and maintained ties with the former first family throughout her life.

Hercules also interviewed actors Lou Gossett Jr. and Cicely Tyson who co-starred with Angelou in Jean Genet’s “The Blacks” in 1961. The documentary perhaps reaches its greatest emotional depth through interviews with Angelou’s son, Guy Johnson, who offers a poignant and intimate account of his late mother.

Hercules learned of Angelou’s passing in May 2014 while filming the project, which first aired on “American Masters” in 2016. “She was a riveting person,” he says. “She was a giant in the world of arts, politics and political activism.”
Hercules initially developed his storytelling skills as a creative writing student at WMU. He felt the University had a strong writing program that would help him progress as an author. In the program, professors pushed him to go deeper and get in touch with his own narrative.

“They always said, with writers, to tell your own story,” Hercules says. “It will have a deeper and more resonant impact. That was the biggest lesson I learned from those professors is to just tell my own story.”

While attending WMU in the late ’70s, Hercules says he started to become aware of the political climate of the time and pointed to when President Carter reinstated the draft. “That's what really, in a sense, politicized me,” he says. “I would say it changed my life because I became very interested in political and social issues, which I still am to this day.”

Hercules’ latest film project is reminiscent of his college days and is based on his experience working as a student deejay for WMU’s own WIDR radio station. During that time, he says, music was moving away from disco to more progressive rock and punk.

The film, which is tentatively titled “Waiting for The Clash,” is a departure from his documentary work, diving into fictional comedy. It centers around students who are fined by the FCC for a vulgar on-air comment and are trying to book the English rock band The Clash to play a concert in Kalamazoo in order to raise money for the fine. As with most comedies, Hercules explains, all hell breaks loose and it’s a disaster.

“They also can't stand disco,” he laughs. “I had a lot of fun making fun of myself, basically in those days, because I was one of those people.”
TURNING FILMMAKING INTO A CAREER

Hercules went on to earn his master’s degree from the University of Michigan and eventually made his way to Chicago in the mid ’80s where he began networking with other filmmakers. In 1985 he and friend David Beaton formed Media Process Group, a video production company with the goal of making independent documentaries entirely in-house. Hercules still co-owns the Chicago-based company today.

“Chicago is a very collaborative city for filmmakers, that's one thing that has kept me here,” he says. “And one thing that I cherish is that most of us here in Chicago, especially the documentary community, are all friends. We help each other out. It's not cutthroat like other places. It's very collaborative. It really means a lot to me to have such great colleagues.”

With advice to aspiring student filmmakers, Hercules says technology has made the gateway to creating films much more feasible economically than when he started making Super 8 films as an adolescent. “I would tell young filmmakers to simply make films and learn as you go,” he says. “You can learn a certain amount at school, but you can also learn a lot by making mistakes, trying things, experimenting.”

While Hercules now calls Chicago home, he was quick to point out how Kalamazoo shaped his creative process and allowed him to grow as an artist. “I just loved my time in Kalamazoo and it was a very fruitful time for me,” he says. “For the size of the town it's amazing the amount of arts, entertainment and farmer's markets – things that give it that big city feel – as well as opportunities to collaborate with different artists around town.”

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On Oct. 3, alumni and friends came together to "give gold" to the College of Arts and Sciences for #WMUGivingDay. This resulted in more than $35,000 for scholarships, research and creative activities. From the bottom of our hearts, thank you! Here's how your gifts help support our students:

https://www.youtube.com/watch?v=oxu-2da_Q7c