FALL 2021

M | SEAS

Stewards

A MAGAZINE FOR ALUMNI AND FRIENDS OF THE SCHOOL FOR ENVIRONMENT AND SUSTAINABILITY

MEET THE FUTURE OF ENVIRONMENTAL JUSTICE

plus:

UNIVERSITY OF MICHIGAN

DEAR FRIENDS:

This fall has brought a return of students in person to our beloved Dana Building, which recently celebrated its 118th year. It's exciting to see our school, and the entire U-M campus, buzzing with activity again.

It's also wonderful to have the opportunity to share with you our new issue of *Stewards*, which is the first print edition of the magazine since Fall 2019.

A lot has happened at SEAS—and the world—since then, and within these pages you'll discover how SEAS is continuing its mission of turning thought leadership into action that advances environmental solutions, sustainability, and justice.

Thanks to generous gifts from donors, SEAS recently launched two major initiatives, the Tishman Center for Social Justice and the Environment and the Kathy and Steve Berman Western Forest and Fire Initiative, which are aimed at solving some of the world's biggest problems: environmental injustice, as well as forest and wildfire management in an era of rapid climate change.

You can learn more about these initiatives in *Stewards*, as well as read stories about how SEAS is meeting the future of environmental justice and sustainable mobility. You'll also read about an alumni couple whose work focuses on sustainable tree planting in Kenya, and about a recent grad whose work involves fighting wildfires and developing ways to mitigate them.

Be sure to check out Dana Sphere and Class Notes as well—lots of impactful work is being done by our alumni in the world at large, and I'm inspired by all the ways our alumni are building a better future. I am also energized by the *passion* of our vibrant SEAS community, and I hope you are too.

Wherever you are and whatever work you do, remember that we are on this planet and journey together, and I am grateful for your continued support and partnership in tackling Earth's most pressing issues.

Be healthy, be well, and go Blue!

Peck

Jonathan T. Overpeck
Samuel A. Graham Dean and William B. Stapp Collegiate Professor of Environmental Education

P.S. Keep up with me and SEAS on Twitter @GreatLakesPeck and @UMSEAS.

MISSION

To help protect the Earth's resources and achieve a sustainable, just society.

Stewards

A magazine for alumni and friends of the School for Environment and Sustainability

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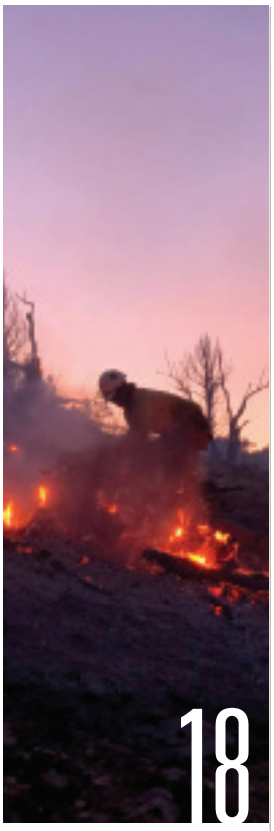
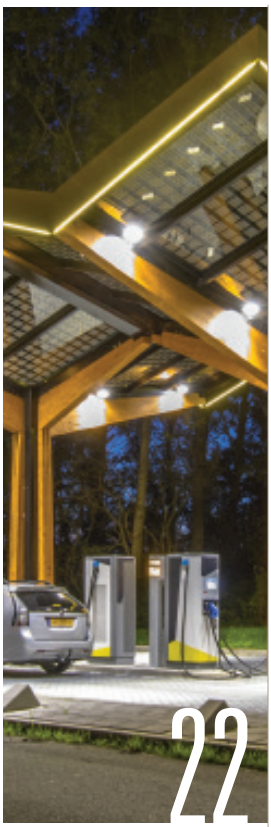


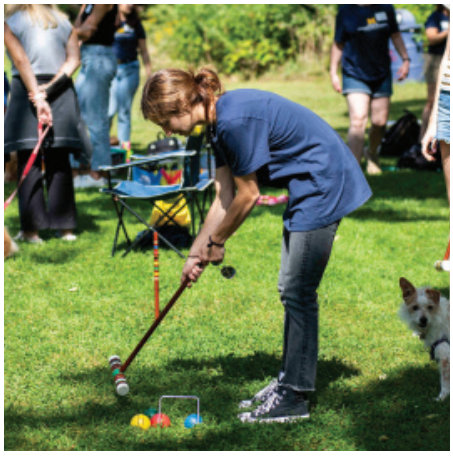


UNIVERSITY OF MICHIGAN

WELCOME BACK!

SEAS students, faculty, and staff joined the U-M community in a return to in-person classes and activities for the new academic year. Orientation, welcome receptions, and Campfire brought us all together and made for a busy—and fun!—start to the fall semester. Campfire, which celebrated its 115th anniversary, was especially memorable, as 300 individuals—a record number—gathered in the Saginaw Forest for wader racing, log sawing, and building a stronger SEAS community.

New Student Orientation in Rackham Auditorium



Returning Student Orientation in Nichols Arboretum

New Student Orientation at Gallup Park


Returning Student Orientation in Nichols Arboretum


Fall Welcome Reception

SEAS Campfire

established 1906

PLANT MORE. DREAM MORE.
ALUMNI RESTORE THE FORESTS OF KENYA

BY DENISE SPRANGER

Andrew Kinzer stands in the pouring rain on a sodden hill in Kenya. He couldn't be happier. "It's great for the seedlings," he says. His wife, Alex, joins him, smiling under the only shelter available—the hood of her parka. "We need trees," she says.

And trees, millions of them, are exactly what these SEAS alumni bring.

As Africa Area Co-directors for Eden Reforestation Projects, Andrew (MS '18) and Alex (MS/MLA '17) Kinzer have launched 25 project sites throughout Kenya, and oversee 500 employees who have planted and maintained nearly 13 million trees in the past year and a half. The grassy slope where the Kinzers now stand will likely—in a few years' time—be sheltered by a forest canopy once again.

Andrew and Alex have been with Eden since 2019, and are in charge of the nonprofit organization's reforestation efforts in Kenya, Mozambique, and Ethiopia. In collaboration with its partners, Eden has planted more than 583 million trees around the world in Ethiopia, Madagascar, Nepal, Haiti, Indonesia, Mozambique, Kenya, and Central America.

"Our mission is really simple," says Alex. "Our goal is to employ as many people as we can to plant as many trees as we can. Because we're so focused, we're able to be very effective."

Alex notes that Eden is one of the few organizations that monitors the trees that they plant.

"It's not just about plunking down the tree and walking away," says Alex. "We create detailed planting strategies on the ground, and species selection that's important for each site. I always tell people: Eden is the real deal. We actually do what we say."

Andrew, who was born and raised in Kenya, and Alex, who grew up in Texas, met as undergrads in Illinois' Wheaton College. After they married in 2012, the couple worked for a conservation organization in Kenya for two years before pursuing their master's degrees at SEAS. They left well prepared for their current roles: Alex with a master's of landscape architecture, along with a master's in conservation ecology; Andrew with a master's in environmental policy and planning.

A MATTER OF SCALE

Eden works on a large scale—very large, explains Andrew, noting that potential land management partners are often taken aback by Eden's scope, as well as its ambitious timeline.

"When we were starting out in-country," he says, "I asked a government forester about the amount of degraded forest under his control, and his answer was 'roughly 4,000 hectares' (the equivalent of nearly 10,000 acres). When he asked me how much we were interested in restoring, I told him, 'All of it.' And that we were ready to start the next month. Needless to say, he was a little surprised."

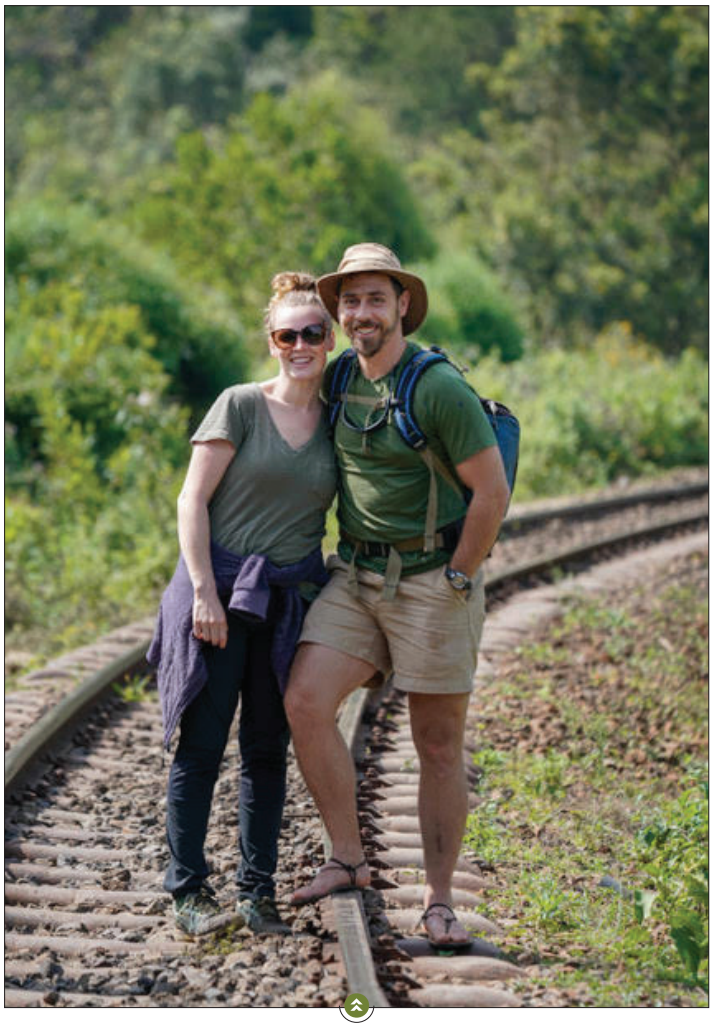
These days, the Kinzers receive requests for planting projects from foresters within Kenya nearly every week. "These projects get a life of their own very quickly," says Alex, "once people realize that we actually do what we promise."

COMMUNITY FIRST

While the scale of Eden's work is impressive, Andrew and Alex stress that the organization maintains its priority of putting "people first."

"Eden's approach to tree planting starts with the communities," says Andrew. "We build relationships, and then work with those communities to be agents of the reforestation that's happening on the ground."

The work involves much more than the planting itself, Andrew explains. Local community members are hired to establish and run the nurseries, continue with the ongoing monitoring, and fulfill the follow-up enrichment plantings.



ALEX AND ANDREW KINZER IN KENYA.

DAVID, A NATIVE OF KENYA, HOLDS A MASTER'S DEGREE IN MANGROVE ECOLOGY. BUT WHEN HE MET THE KINZERS, HE WAS STOCKING SHELVES AT A SPORTING GOODS STORE DUE TO A LACK OF JOB OPPORTUNITIES. NOW, DAVID SUCCESSFULLY RUNS EDEN'S MANGROVE PROGRAM IN KENYA. ANDREW DESCRIBES HIM AS A "COMPLETE SUPERSTAR."

"We're basically providing employment in quite literally some of the poorest communities—with the least access to resources—in the entire world," says Alex. "Local people are making incredible opportunities for themselves with the income they make from Eden. It's just amazing. Small businesses are popping up in these totally remote places, and you hear about people who have now sent their kids to university. And I admit, I've wondered 'How?' It takes days to even get here. How did they apply from here? But they found a way."

A WELCOME CHALLENGE

Andrew and Alex joined Eden during a period of exponential growth within the organization, and interest from business partners eager for plantings was especially high.

"It's hard to describe to a business partner all the logistics that go into setting up a planting site," says Andrew, "and that includes generating community engagement, establishing and building a nursery, sourcing seed, and germinating healthy seedlings. There's a whole life cycle of a project that needs to happen before a project can actually launch."

Alex describes what has become a typical Monday. "You wake up, and in your inbox, there is an email that says: we need a spot where we can plant a million trees within three days," she says. "And that happens almost every week."

"It's hard sometimes," says Andrew with a smile. "But it's a good challenge to have, right?"

RETURN OF BIODIVERSITY

Eden's reforestation projects in Kenya are still in their early stages, so it will be some time before former levels of biodiversity return. But in nations where Eden has been working for several years, there is much to celebrate: forest elephants grazing in previously deforested areas in Nepal; fish species, mangrove crabs, and prawns that had all but disappeared thriving again in Madagascar. And in a Kenyan forest—where a local organization, the Kijabe Forest Trust, has been working since 2013—there are reports of returning hyena, leopards, great porcupines, and a variety of forest antelopes.

Andrew notes that in addition to wildlife, the diversity of tree and plant species is also a vital component in the ecosystem.

"We're focusing on planting species that are medicinally valuable to communities, both for human use and livestock use," says Andrew. "We're helping to bring back some of the functional safety net options for communities that they have relied on for millennia. Restoring that level of function and diversity is a very core part of the job."

SEAS EXPERIENCES, THEN AND NOW

Andrew relates that he continues to collaborate on research with SEAS faculty, and values the ongoing connections. "The faculty has remained continuously supportive even after we earned our degrees," says Andrew. "I'm still in regular communication with a number of professors—such as Arun Agrawal, Bilal Butt, Steve Yaffee, and Julia Wondolleck. I know that they see a million students go through their classrooms, but they're all still very much invested in and care about the people that go through their programs."

Andrew reflects upon the value of the SEAS experience that he and Alex shared.

"The pace, the rigor of the work, the people and the professors we got to interact with—really taught us not just the hard skills of how to do a lot of these things, but also a lot of the mindsets that are needed to critically think about these problems, and determine a way to solve them that's creative, thoughtful, and adaptable."

Alex expresses appreciation for Professor Joan Nassauer, her former advisor in the Landscape Architecture program.

"She was—and still is—a huge resource for me in terms of being a woman in leadership, and being a mom in leadership," says Alex. "I think that people like her provide good examples to students like me who have big dreams, but who aren't sure how to make them happen."

ABOVE: A NURSERY PREPARES YOUNG TREES FOR PLANTING.
RIGHT: ANDREW KINZER WORKS WITH LOCAL KENYANS TO MEASURE TREE GROWTH.

Alex and Andrew have two daughters now, Liana, nearly 4, and Charlotte, just 6 months old. Alex recalls that she finished her master's thesis at SEAS in her first trimester, and walked across the Rackham commencement stage while still carrying her daughter. "I guess that makes Liana ahead of the game academically," she says with a smile. "She's already graduated with me."

AT HOME IN KENYA

Co-directing Eden's Africa Area projects while raising their young family in-country is, in many ways, a dream come true for the Kinzers.

"I enjoy living out here," says Alex. "We have really wonderful colleagues, and the work is just great to be a part of. It's what we always envisioned, and exactly what we hoped for after graduating."

Andrew shares Alex's satisfaction with where life—so far—has taken them.

"The fact that we have the opportunity to approach our plantings strategically—and that we have the funding to actually accomplish them—is incredible," says Andrew. "For us, it's like a constant process of actually doing the thing that the world urgently needs us to do."

Alex agrees.

"It's really empowering to do this work, and at this scale," says Alex, "while knowing that we can always build more teams and plant more trees. So, this is the creed we live by: Do more. Plant more. Dream more."

MEET THE FUTURE OF ENVIRONMENTAL JUSTICE

BY DENISE SPRANGER

For nearly three decades, SEAS has been on the forefront of environmental justice education and research—initially bolstered by the landmark "Michigan Conference on Race and the Incidence of Environmental Hazards" hosted at the Dana Building in 1990. Just two years later, the school became the first in the U.S. to launch an Environmental Justice program that offered both undergraduate and graduate degree specializations.

Building upon that early milestone, SEAS continued to deepen its impact through scholarship, advocacy, community partnerships, and master's projects—with environmental justice at the core of its mission to create a more environmentally sound and sustainable world.

Today, SEAS is at the nexus of environmental justice thought leadership, and is recognized as a trusted resource for expertise on both state and national levels.

Following last year's appointments of four SEAS faculty and alumni to state advisory roles in Michigan, the Biden administration appointed three SEAS faculty to national advisory positions in 2021. The contributions of Professors Paul Mohai, Tony Reames, and Kyle Whyte are now helping to meet—and shape—the future of environmental and energy justice.

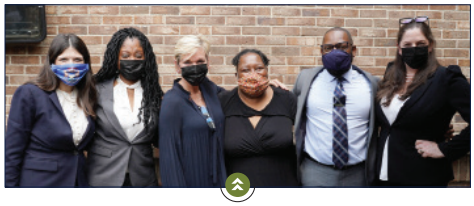
ASSISTANT PROFESSOR TONY REAMES

SENIOR ADVISOR, DEPARTMENT OF ENERGY'S (DOE) OFFICE OF ECONOMIC IMPACT AND DIVERSITY

In his role for the DOE, Assistant Professor and Energy Justice Lab Director Dr. Tony Reames is responsible for energy justice policy and analysis to ensure energy investments and benefits reach frontline communities and Black, Indigenous, and other communities of color. Reames was recently awarded a grant from the Office of the Vice President for Research, in partnership with the National Center for Institutional Diversity, for his project, "Enhanced Energy Monitoring for Energy Justice in Detroit."

Reames, a U.S. Army veteran who reached the rank of captain, shares his thoughts on his White House appointment.

"I'm honored to once again serve our country, this time in a role to ensure that every American household is able to benefit from a cleaner, more affordable energy system that will create jobs, protect the environment, and build wealth, particularly in communities of color and for underserved populations," says Reames. "The opportunity to shape our government's approach to energy justice, while recognizing how past decisions created the environmental injustices communities experience, is a responsibility I do not take lightly."

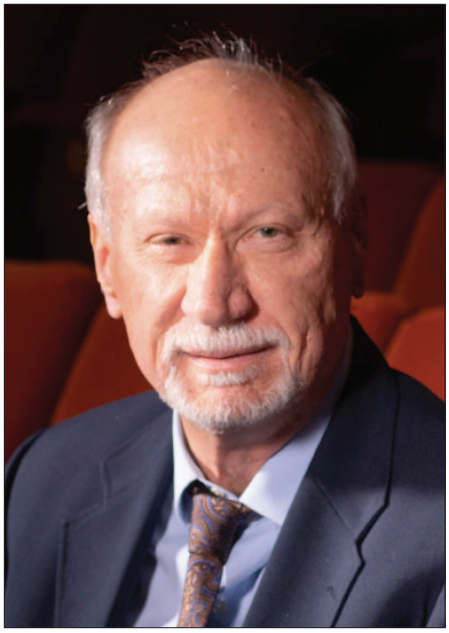


BOTTOM PHOTO: REP. HALEY STEVENS, MARNESE JACKSON (MIDWEST BUILDING DECARBONIZATION COALITION), SECRETARY OF ENERGY JENNIFER M. GRANHOLM, TAMMY BLACK (MANISTIQUE COMMUNITY TREEHOUSE, DETROIT), PROF. TONY REAMES, AND KERRY DUGGAN (MS '06) MET IN AUGUST TO DISCUSS ENERGY JUSTICE AND THE DEPARTMENT OF ENERGY'S JUSTICE40 INITIATIVE EFFORTS.

TOP PHOTO: REAMES WITH GRANHOLM AND DUGGAN.

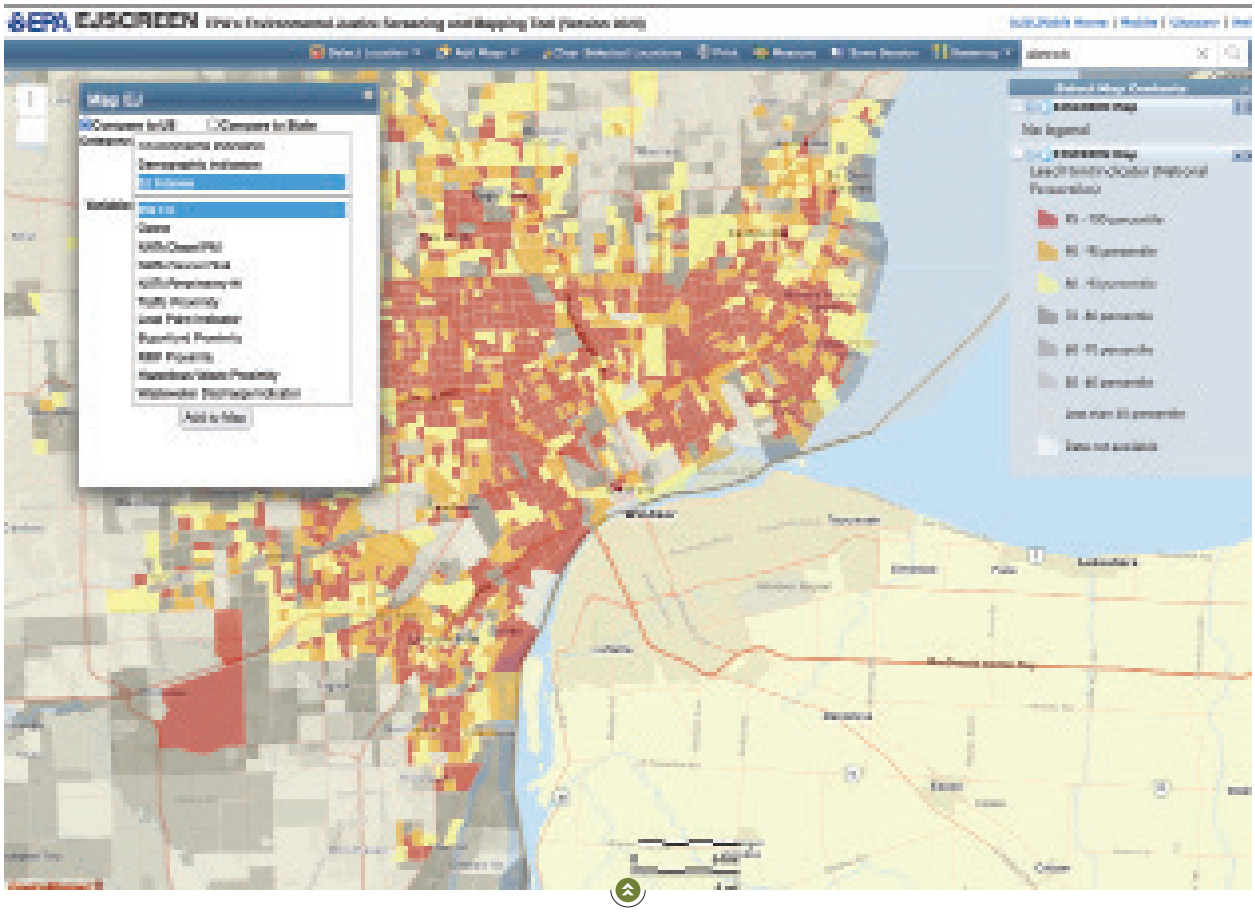
PROFESSOR PAUL MOHAI

U.S. ENVIRONMENTAL PROTECTION AGENCY'S EJSCREEN MICHIGAN ADVISORY COUNCIL ON ENVIRONMENTAL JUSTICE



Dr. Paul Mohai is a professor of Environmental Justice, and Environmental Policy and Planning at SEAS. He is the co-founder of the Environmental Justice program at U-M and a major contributor to the growing body of quantitative research examining disproportionate environmental burdens and their impacts on low-income and people of color communities. Mohai has been tapped to lead nationally—by helping in the federal government's efforts to review, improve, and advance Environmental Justice Screening and Cumulative Impact Assessment Tools, such as the U.S. Environmental Protection Agency's EJSCREEN.

"In the wake of the Flint Water Crisis, and with many years of a growing environmental justice movement and accumulating scientific evidence behind it, momentum for creating and implementing policies that result in genuine reductions in pollution burdens and improvements in public health in overburdened and disadvantaged communities has reached a tipping point," says Mohai. "It is unimaginable that at this point in time environmental justice leaders and impacted communities will settle for anything less than policies that will produce real measurable outcomes."



EPA'S ENVIRONMENTAL JUSTICE SCREENING AND MAPPING TOOL. HTTPS://EJSCREEN.EPA.GOV/MAPPER

PROFESSOR KYLE WHYTE

WHITE HOUSE ENVIRONMENTAL JUSTICE ADVISORY COUNCIL

Dr. Kyle Whyte is the George Willis Pack Professor of Environment and Sustainability and the specialization coordinator for the Environmental Justice program at SEAS. He also serves on the Management Committee of the Michigan Environmental Justice Coalition, and is an enrolled member of the Citizen Potawatomi Nation. His most recent research, "Effects of land dispossession and forced migration on Indigenous peoples in North America," was published in the journal *Science*.

Whyte is one of five academics on the 26-member White House Environmental Justice Advisory Council, most of whom represent communities burdened by environmental hazards. He shares his perspective on the goals and challenges of the Council's work, along with his vision for the nation's focus on Environmental Justice.

KYLE WHYTE Q & A

As a member of the White House Environmental Justice Advisory Council, what areas do you consider most in need of progress?

It's important for government agencies to continually refine the ways in which they hold themselves accountable to communities affected by discrimination. The creation of accountability measures that agencies can abide by is a key area of progress for environmental justice. The meaningful involvement of communities is another key area where great improvement can be made, ensuring that agencies respect the free, prior, and informed consent of people who face severe environmental risks.

What barriers must the Biden administration overcome to achieve its environmental justice goals?

One of the key barriers is the impetus to support climate change solutions without evaluating their environmental justice ramifications. There are certain solutions to climate change—nuclear energy, for example—that have caused great pain among people like Indigenous peoples, and could perpetrate further equity issues if expanded.

As specialization coordinator of the Environmental Justice program at SEAS, what is your vision for how the program will evolve?

Across its history, the Environmental Justice specialization has been most successful when it has fostered a community of students, staff, and faculty who are committed to the values of environmental justice. One of my goals is to foster a strong intellectual community where everyone supports each other. I hope to strengthen the intergenerational community too, further connecting current students with alumni. A strong intellectual community is what we need to be a place where we can create innovations in environmental justice in areas such as law and policy, science and research, advocacy and organizing, fundraising and philanthropy, and media and education. I want a vibrant community that is generative of creativity and mutual exchange.

How does SEAS prepare students to meet the future of environmental justice?

The SEAS Environmental Justice specialization is poised to be a place where the knowledge of communities is a non-negotiable dimension of the work needed to achieve environmental justice. We will engender a culture at SEAS that respects the diversity of knowledge, and the importance of ethically founded partnerships among advocates of environmental justice who come from different walks of life and have different talents and skills. It's important to ground environmental justice education in the voices, knowledge, and wisdom of communities who have been on the frontlines resisting inequity and calling for just and sustainable futures.

PROFESSOR WHYTE FACILITATES A TALKING CIRCLE WITH INDIGENOUS PARTICIPANTS AT THE INDIGENOUS PLANNING SUMMER INSTITUTE AT THE MENOMINEE NATION

MICHIGAN ADVISORY COUNCIL ON ENVIRONMENTAL JUSTICE

In 2020, Gov. Gretchen Whitmer appointed SEAS Professors Paul Mohai and Tony Reames, SEAS alumni John Petoskey (MS/JD '20)—still a master's student at the time—and Mona Munroe-Younis (MS '11) to the Michigan Advisory Council on Environmental Justice. It is the first external advisory council to help guide environmental justice policy and decision-making in Michigan.

JOHN MINODE'E PETOSKEY (MS/JD '20)

ASSOCIATE ATTORNEY, ENVIRONMENTAL LAW AND POLICY CENTER, CHICAGO

ENROLLED CITIZEN, GRAND TRAVERSE BAND OF OTTAWA AND CHIPPEWA INDIANS

"I carry my homeland in my heart in all the work that I do. The reason I am working in the field of environmental advocacy is simple: to protect our homeland and the Great Lakes for the coming seven generations, just as my ancestors seven generations ago preserved our homeland for me."

MONA MUNROE-YOUNIS (BS '06, MS '11)

NEIGHBORHOOD PLANNER, CHOICE NEIGHBORHOODS INITIATIVE, CITY OF FLINT

EXECUTIVE DIRECTOR, ENVIRONMENTAL TRANSFORMATION MOVEMENT OF FLINT

RACIAL HEALING PRACTITIONER FOR THE TRUTH, RACIAL HEALING & TRANSFORMATION INITIATIVE, FLINT

"The three most pressing issues for EJ movements are: 1) systemically shifting to renewable energy and combating climate change; 2) state-level policy change to bake cumulative impact analysis into permitting processes, which disproportionately harm people of color and low-income people near multiple sources of pollution; and 3) preservation/expansion of Indigenous/tribal environmental rights and cultural landscapes. Right now, we're fighting a new EJ threat—Ajax's plans to build an asphalt plant across from Flint's largest public housing complex, where breathing issues are widespread from the nearby incinerator and other polluting facilities. Michigan's environmental policies are failing Flint once again."

PHOTO COURTESY OF DAN AND SHERYL TISHMAN

$11 MILLION GIFT FUNDS NEW TISHMAN CENTER FOR ENVIRONMENTAL JUSTICE

The NorthLight Foundation and Dan and Sheryl Tishman have committed an $11.125 million gift to SEAS to expand the school's environmental justice efforts and impact at a pivotal time for social justice.

"As environmental funders, for decades we have discovered that frontline communities have been largely left behind by the environmental movement," say Dan and Sheryl Tishman. "These communities have very little voice in the battle for a clean environment and climate change, but sadly have been the most impacted. It is our mission to invest our philanthropy in places where there is a great need and little investment. Environmental justice is at the heart of solving the greatest environmental challenges of the day. We know of no other university that has been willing to establish a center focused on environmental justice. We are so excited to be partnering with Michigan to create this one-of-a-kind program."

The Tishman Center will enable SEAS to expand the scope of its Environmental Justice program and integrate environmental justice more effectively into all solutions for the planet. The gift will provide funding to hire and retain additional top environmental scholars across disciplines. As part of its goal to create more cross-campus partnerships with other schools and colleges and embed environmental justice within all fields, the new faculty positions will be hired within SEAS and the College of Engineering. The gift also will provide for expanded justice programming and training, and allow for the recruiting of top students from underrepresented backgrounds who lack the resources to study in SEAS' preeminent environmental justice program.

Dr. Jonathan Overpeck is the Samuel A. Graham Dean and William B. Stapp Collegiate Professor of Environmental Education at SEAS. "It is more critical than ever," he says, "that those in interdisciplinary fields across U-M, including engineering, have a firm understanding of how to integrate environmental justice into real-world solutions that address climate change and sustainability. The new center will help ensure that SEAS is positioned to have the greatest impact in the communities with the greatest need."

Through their NorthLight Foundation, the Tishmans make investments at the "intersection of human and environmental landscapes and work with organizations to deliver high impact and systemic change." The family has a multigenerational legacy at U-M: Their son, Gabe (AB '19), and Dan's late father, John (BSE '46), are both U-M alumni. As longtime supporters of the university, the family's combined charitable gifts, which include donations to the College of Engineering, Michigan Athletics, and this most recent commitment, will total more than $25 million.

FIGHTING WILDFIRES IS A 'DELICATE BALANCE'

A MEMBER OF THE BUREAU OF LAND MANAGEMENT MOJAVE ENGINE CREW REDUCES THE HEAT AROUND HOT AREAS OF THE ANTELOPE FIRE IN NORTHEAST CALIFORNIA.

BY LORI ATHERTON | PHOTOS BY HAROLD RICE

Harold Rice (BS '16, MS '19) has tremendous respect for the wildland firefighters who put their lives at risk to contain active wildfires, particularly in the West.

For two months over the summer, Rice took on that physically demanding job as part of a helitack, or helicopter, crew that was stationed in Moab, Utah. He often worked 16-hour days suppressing fires in southeastern Utah and western Colorado.

Some fires were short—burning for one or two days—while others lasted for several weeks or longer. Rice didn't know what type of wildfire situation he would encounter until he and his crew arrived on the scene.

"Your adrenaline rises quickly in those moments. You are excited, and somewhat concerned, to see what that smoke on the other side holds," says Rice, who works for the U.S. Forest Service.

"Will you be suppressing a fire barreling toward someone's home? Will you be going to a fire that is so big you can only sit back and watch until more resources arrive? Will you be getting out with only your crew to put out a few trees? The fear of the unknown is certainly there, but also the fear of knowing that getting into a helicopter over a fire is a hazard and getting out of it to fight a fire is yet another.

"The blessing in these moments is that you will work off that ever-building adrenaline and get to see the fruits of your labor in putting out that fire."

EMERGENCY RESPONDER

Putting out fires is not Rice's primary job. As a fire technology specialist with the Forest Service, he develops new tools and technologies for fire management in the southeastern United States, or Region 8, which encompasses 13 states and Puerto Rico.

A big part of Rice's job, though, is emergency response. He has assisted with national emergencies including hurricanes and the COVID-19 pandemic, as well as wildfires, which brought him to Utah in June.

At that time, the western United States was at preparedness level five—the highest level—for wildland fire activity, creating a dire need

for responders from the Bureau of Land Management, Forest Service, National Park Service, and other land management agencies to step in and help.

"What happened this year—and what is happening almost every year now—is that the Western fire season gets so incredibly intense that there aren't enough firefighters out West to fight the wildfires themselves," notes Rice, who estimates that he responded to about 15 wildfires while serving on the helitack crew in Moab.

Rice describes being on a fire call in which the escape road he had planned to use became inaccessible. The fire had crossed the road and was heading toward him, so Rice's crew had to find a safety zone—in this case, a large grassy area—where he could wait until the fire passed.

"It was a scary situation since it was my first time caught in an environment like that where the fire was all around me," says Rice. "That's when the more experienced firefighters had to reassure me that the safety zone would protect us."

He also recalls what it was like being on the front lines, battling blazes with his crew. "Even when your adrenaline is pumping, the heat quickly brings you back to reality," Rice explains. "The fire intensity can be so high that you feel the hairs on your face nearing combustion, as though you might yourself catch on fire or get a severe burn just from working the open flames."

Along with the heat and flames, smoke is another hazard of the job, its effects exacerbated by the changing weather. "Each time the wind shifts, which occurs a lot due to fires creating their own weather, you are inundated with smoke," Rice adds. "The thick haze fills your eyes, making it nearly impossible to see; it then quickly moves to your lungs, causing difficulty in breathing, until nature gives you the remedy with another wind shift.

"It's a delicate balance between needing to get the fire suppressed while also making sure your body is protected enough to continue fighting hour after hour, day in and day out."

THE FUTURE OF WILDFIRE MANAGEMENT

When Rice isn't responding to emergencies, he's focused on how to reduce the likelihood and/or intensity of future wildfires. The Forest Service primarily utilizes prescribed burning, a hazardous fuels reduction technique, in the southeastern region of the United States, where environmental conditions tend to be less dry than in the West.

Prescribed burns involve the controlled burning of the forest understory, such as brush or grasses, to reduce hazardous forest fuels that could ignite tree canopy and create an extreme fire.

While prescribed burning isn't without risk, Rice notes, the benefits far outweigh the liabilities. "Burning can bring organisms back to an ecosystem while also protecting the people who live in that area and reducing the number of dangerous fuels there," says Rice, who notes that prescribed burning originated with Indigenous cultures.

THE SUN SHINES THROUGH THE SMOKE AND FIRE AS A PRESCRIBED BURN REMOVES THE FOREST UNDERSTORY IN THE NATIONAL FOREST IN MISSISSIPPI.

HAROLD RICE STANDS NEAR THE MOAB HELITACK CREW'S HELICOPTER FOLLOWING A FIRE OPERATION NEAR BLANDING, UTAH.

THE MOAB HELITACK CREW APPROACHES A FIRE IN THE BOOK CLIFFS OF SOUTHEAST UTAH.

A MEMBER OF THE MOAB HELITACK CREW CUTS DOWN A BURNING STUMP DURING THE BUSHY SPRINGS FIRE NEAR BLANDING, UTAH.

MEMBERS OF THE DALTON HOTSHOTS REMOVE UNBURNT TREE LIMBS FROM A HOT TREE NEAR THE EDGE OF THE ANTELOPE FIRE IN NE CALIFORNIA.

A MEMBER OF THE MOAB HELITACK CREW CALLS ON THE RADIO TO RECEIVE FIRE INFORMATION DURING A FIRE IN CASTLE VALLEY, UTAH.

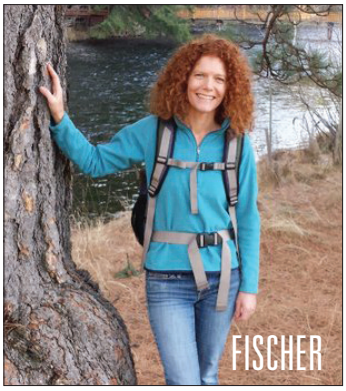
Rice sees prescribed burning as an effective tool that could be employed in the West, though overall, he views the future of wildfire management as one involving multiple approaches.

That could mean allowing fires to burn up a larger portion of land because it's beneficial for that ecosystem, Rice says. Or it could mean reducing the amount of forest fuels as part of timber reduction projects in which trees are cut down or brush is removed using bulldozers or other machines. It could also mean using herbicides or other treatments to kill off the forest understory.

"I think it's pretty clear that the wildfire problem isn't going away, and it's only getting worse," Rice says. "These ecosystems have burned for thousands of years, and they're not going to stop burning just because we want them to. There needs to be a balance between understanding how to manage wildfires and protect people who are living in those areas, but also trying to manage wildfires to consider the best decision for the land.

"My hope is that there will be more managing of fires for ecosystem benefits," he adds, "but that there will continue to be suppression efforts to protect property and individuals."

KATHY AND STEVE (BS '76) BERMAN WESTERN FOREST AND FIRE INITIATIVE



Dr. Paige Fischer, an associate professor at SEAS, was working towards earning her PhD in forest resources social science at Oregon State University, researching private landowners' behavioral motivations to conserve oak habitat, when she recalls wildfires becoming a major public policy issue for the first time. "The community of people who were involved in managing and conserving forests started realizing that it wasn't only about protecting forests from exploitation anymore. The bigger issue was fire and the fact that forests had become unhealthy because of past management, but also because of climate change."

Fischer pointed out that as forest fires have become a more serious issue in the U.S., those involved in the forestry sector must now consider managing for fire before all other issues. The increase in the severity and number of forest fires in past years has brought together historically adversarial parties; conservationists and the forestry industry now have a common ground.

Currently, Fischer researches human behavior in the context of environmental change, specifically in forests. She will lead the Berman Western Forest and Fire Initiative (WFFI), which recently was established at SEAS by a philanthropic gift from Steve (BS '76) and Kathy Berman.

The initiative will involve U-M faculty, postdoctoral researchers, and students from a wide range of disciplines including behavioral sciences, ecology, engineering, and economics. They'll work with researchers based in the western United States to better understand and manage how to maintain a healthy relationship between forests and the communities that depend on them.

Unlike other programs that focus on wildfires as a forest management or fire management problem, the WFFI is unique because it approaches western forests and communities as a complex and changing social-ecological system that involves forests, fire, climate, and communities, says Fischer. The WFFI's goal is to develop new ways of understanding and managing this social-ecological system.—*Kelsey Keeves*

PHOTO COURTESY OF KATHY AND STEVE BERMAN

JOHN VANCE (BS '59): 'WHOLESALE' FOREST MANAGEMENT EFFORTS

John Vance (BS '59) is no stranger to the threat of wildfires. He and his wife, Marion, live in Woodland Park, Colorado, on land that is bounded on three sides by the Pike National Forest. From his home, Vance can still see the firebreak from the 2002 Hayman Fire, a 138,000-acre burn that was then the largest fire in Colorado's history. Since then, wildfires in the state have increasingly become larger, Vance notes, with last year's fires exceeding 200,000 acres.

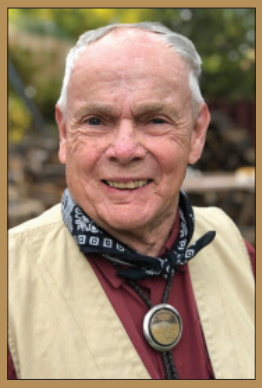


Photo courtesy of Don Jones, Studio 9 Commercial Photography

Vance spent 36 years with the United States Department of Agriculture (USDA)—26 of them with the U.S. Forest Service. During his long career, Vance dealt with his share of wildfires, and noticed three major changes over the years: Fire seasons became much longer (nearly year-round in some places); large fires became more prevalent; and fires are continuing to impact more and more communities—and in more devastating ways.

"Now, there are much higher values at risk—by that, I mean life and property—than in previous decades," Vance says. "There is an urban-wildland interface, where there is much more residential development in forest situations than there was 60 or 70 years ago. In addition, forest fuels, or flammable materials, have become dryer and more combustible over the years given the increasing droughts facing the West and other parts of the country."

Pre-suppression efforts, such as the management of forest fuels, is one solution that could help to prevent fires before they start, says Vance, but those efforts require "wholesale" coordination at the federal, state, and local levels.

"We need to conduct intensive fire hazard reduction work throughout the West, and perhaps the country at large, where we do careful planning as to which areas we treat first based on fire behavior predictions and the values at risk," Vance says. "It's being done now, but on a very fragmented basis. There needs to be a wholesale campaign to not only treat Western and national forests, but also federal, state, and private lands, too. It's going to take a lot of players, consortium building, and additional funding to create this type of forest management initiative."

Vance, whose career also included 10 years with the USDA Extension Service, says that "seeing 'on the ground' results from land management and believing that I had some influence in planning and educating to benefit the nation's natural resources," were the rewarding parts of his job. A career highlight was serving as District Ranger in the Pagosa District of the San Juan National Forest, where, as the manager of nearly a half-million acres, "it was a 'hands-on' job in blending production of timber, livestock forage, quality water, wildlife habitat, and multiple recreational opportunities," Vance says. "It is the position where, looking back, I now wish I had devoted far more of my total career."

DRIVING THE FUTURE OF SUSTAINABLE MOBILITY

BY DENISE SPRANGER

In the sustainable mobility space, there is no shortage of innovation. And as the old barriers begin to fall, we must navigate the choices—with a clear eye on the road ahead. For real direction, not detours, we look to the leaders in research.

For 30 years, the Center for Sustainable Systems (CSS) at SEAS has focused on sustainability assessments of products and emerging technologies, and transportation has been a critical part of that research since its inception. CSS led life-cycle analysis research for the U.S. Council for Automotive Research, U.S.-China Clean Energy Research Center Clean Vehicle Consortium, and Lightweight Innovations for Tomorrow (LIFT).

Recent CSS transportation research includes studies of Electric Vehicles (EVs), Connected and Automated Vehicles (CAVs), Vertical Takeoff and Landing Aircraft (VTOLs), vehicle lightweighting, road and charging infrastructure, and automobile circular economy, to name but a few. Among the latest papers published, CSS researchers addressed EV battery degradation and charging strategies, stationary and dynamic wireless charging technology, last-mile parcel delivery by automated vehicles and robots, shared mobility and taxi fleets—as well as the greenhouse gas (GHG) emissions for natural gas vehicles and hydrogen fuel-cell vehicles in China.

So, what are the most viable solutions? CSS Director Dr. Greg Keoleian emphasizes that sustainable mobility solutions must address time, comfort, convenience, safety, cost, and importantly, equity and access.

We asked Keoleian for a quick take on where we're headed—and which routes are on the fast track to get us there.

ELECTRIC CAR CHARGING STATION IN THE NETHERLANDS

INDUSTRY TRENDS

I used to live in the Netherlands, which is where Shell is headquartered. Across Europe, Shell is buying electric charging companies because it knows that if it wants to be in the business of fueling cars, it's going to have to own and operate electric charging stations. Shell has stated that its goal is to be the world's largest electricity company. BP aims to cut its Scope 1 and 2 emissions to zero by 2050. Even Exxon says it supports the goals of the Paris Accord. In large part, I think that industry, including the auto manufacturers, has seen the writing on the wall."

—Dr. Parth Vaishnav

VEHICLE ALTERNATIVES

ELECTRIC VEHICLES (EVs)

Keoleian finds that EVs provide the greatest opportunity for improving vehicle efficiency and decarbonizing mobility by shifting the fuel mix of the grid to renewable sources. While EVs represent only 3% of new vehicle sales today, this number could reach 50% by 2030, an aspirational goal of the auto industry. "We need to accelerate the EV transition, and there is over 100 years of inertia and powerful interests behind petroleum and gasoline engines to overcome," says Keoleian. "That will require scaled-up production of EVs, additional charging infrastructure, and rapid decarbonization of the grid with wind and solar deployment." He adds that making EVs accessible to low-income households and communities is a critical energy justice challenge to address.

Keoleian relates that battery materials and technology are a key determinant of EV costs, adoption rates, and environmental impacts, and notes that CSS automotive battery studies have ranged from analyzing global lithium supply to developing green principles for responsible battery management. Keoleian adds that dealerships need EV training too, based on his recent experience purchasing a new plug-in hybrid electric vehicle.

CONNECTED AND AUTOMATED VEHICLES (CAVs)

While some of the CAV technology is being applied to vehicles today, such as lane-keeping systems and automatic emergency braking, Keoleian doesn't expect to see widespread deployment of fully automated vehicles in the next decade. "At CSS, we have found that the sustainability benefits of CAVs from ecodriving, platooning, and intersection connectivity are offset by increasing loads from CAV equipment and computing power," says Keoleian.

An unintended consequence of CAVs is known as the "rebound effect." In their 2019 study, SEAS professors, Drs. Ming Xu and Sam Stolper, explored the possibility that automation could lead to a net rise in energy use, especially in higher income groups. This is because automation could change our patterns of where we live relative to where we work, and lead to sprawl. "You may be willing to add commuter miles because you can read the paper or take a nap during your trip," says Keoleian.

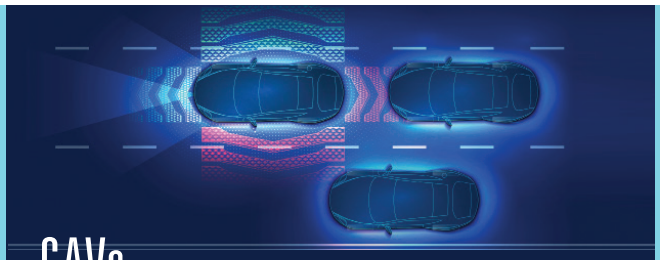
"There are many challenges ahead," Keoleian notes. "A rapid response to the climate crisis that would meet IPCC 1.5°C GHG emissions reduction trajectories will require perfect alignment of sustainable technologies, markets, policy incentives, and behavior change. All of us will need to play a role, and I am especially encouraged by our alumni working to advance sustainable mobility solutions in the private and public sectors including Ford, GM, Fiat Chrysler Automobiles, Tesla, U.S. EPA National Vehicle and Fuel Emissions Lab, Argonne National Lab, National Renewable Energy Lab, Rocky Mountain Institute, City of Detroit, City of Ann Arbor, and the Biden administration, as well as faculty such as Alissa Kendall (MS '04, PhD' 07) and Hua Cai (PhD '15)."

MEET THE FUTURE

EVs

Primary challenges: charging infrastructure, charging time, battery recycling, higher upfront costs leading to equity and accessibility issues, barriers at dealerships hindering adoption

Benefits: better fuel economy, lower GHG emissions in operation as grid decarbonizes, lower fueling and maintenance costs, better performance, quieter ride



CAVs

Primary challenges: Technology costs, data security, liability, potential for increased congestion, vehicle miles traveled, urban sprawl, total time spent traveling (which can lead to greater energy consumption and emissions), higher upfront costs of private car ownership leading to equity issues

Benefits: improved fuel economy through ecodriving, platooning, and intersection connectivity, improved crash avoidance and safety, also leading to vehicle lightweighting, providing mobility for elderly and disabled people

PARTH VAISHNAV'S POINT OF VIEW

Dr. Parth Vaishnav is a new assistant professor at the Center for Sustainable Systems at SEAS. His research aims to understand how technology can help solve social problems, and he is particularly interested in finding ways to make both mitigation and adaptation equitable.

Vaishnav shares a few thoughts on sustainability issues—from freight to flight, and raises questions of equity and justice.

JUST BETTER VEHICLES

"Electric motors are incredibly durable, and the lifetime of electric batteries is continuously increasing. An electric drivetrain needs less maintenance (e.g., no oil changes). And because you don't have engine noise or vibration, the ride is more comfortable, and quiet. EVs are also safer—the heavy battery keeps the center of gravity low, with less risk of toppling. The absence of an engine block could improve crash performance. So, beyond the sustainability aspect, I think people are going to conclude that EVs are just better vehicles. And in four to five years' time, they will also be cheaper."

ACCESS AND ENERGY JUSTICE

"We have to make sure that the new technology becomes available to everyone, and that we don't effectively create a regressive subsidy. On its face, the $7,500 federal tax credit on the purchase of some EV models is great. But today, the person who buys an EV is probably relatively well-off, and can wait for that benefit. A more accessible solution might be giving cash rebates at the point of sale, or the option of a substantial rebate on an E-bike, instead."

BEYOND EVs

"Ultimately, to achieve sustainable mobility, there's much more to think about than just replacing all the gas-fueled cars with electric cars. We must improve public transit, increase ridership, and further develop the infrastructure for biking. We also must encourage and support people in transitioning to those alternatives."

FREIGHT

"In electrifying a semi-truck with a range comparable to diesel truck, you end up with a very large battery carrying a small amount of freight. Another issue is charging: plugging in a 500-kilowatt hour battery and trying to charge it in half an hour puts the same amount of stress on the grid as plugging in 60 or 70 houses. So, for freight, we're going to have to be creative. Maybe we do hydrogen; maybe we don't use batteries at all. Or we build catenaries, where trucks operate like trams once did."

FLIGHT

"For small planes on short hops, I think there is a path to electrification, but beyond that, I don't know how you do it. The National Academies concluded in a 2016 report that over a 20-year time frame, they didn't see how you could do it either. Of course, technical progress has a way of making fools of everyone, so you never know. Meanwhile, we should be more circumspect about how we fly. Weekend getaways 3,000 miles away are just decadent. But we must be careful about how we reduce air travel—and remember that a lot of the world does not fly at all, right? So, by saying that 'we' should fly less, are we saying that I should fly less to conferences, but someone in India or Indonesia should never fly?"

JIM GAWRON (BSE '10, MSE '11, MBA/MS '19)

Electric Vehicle Ecosystem Manager in the Ford Business Leader Program at Ford Motor Company

While pursuing dual degrees at SEAS and the Ross School of Business, Sustainable Systems graduate Jim Gawron produced research on CAVs as well as published work on Vertical Takeoff and Landing Aircraft (VTOLs), also known as "flying cars."

"I see the best path toward sustainable mobility as a feedback loop involving intentional urban planning and smart infrastructure, coordinated deployment of new mobility technology, and behavior change. Sustainable mobility must start with the design of our cities to foster a 'walk or bike first' mindset and convenient access to home, work, and play locations. New technology such as electric vehicles and shared autonomous shuttles can then integrate with robust public transit to fill in the use cases for longer distance travel. Underpinning this all is consumer behavior change to embrace these multi-modal forms of travel. Overall, sustainable mobility can be achieved through the orchestration of these complex systems leveraging data, connectivity, and new platforms tailored for regional differences. The result will be an efficient ecosystem that allows for the freedom of movement to drive continued societal progress."

MARYAM ARBABZADEH (PHD '18)

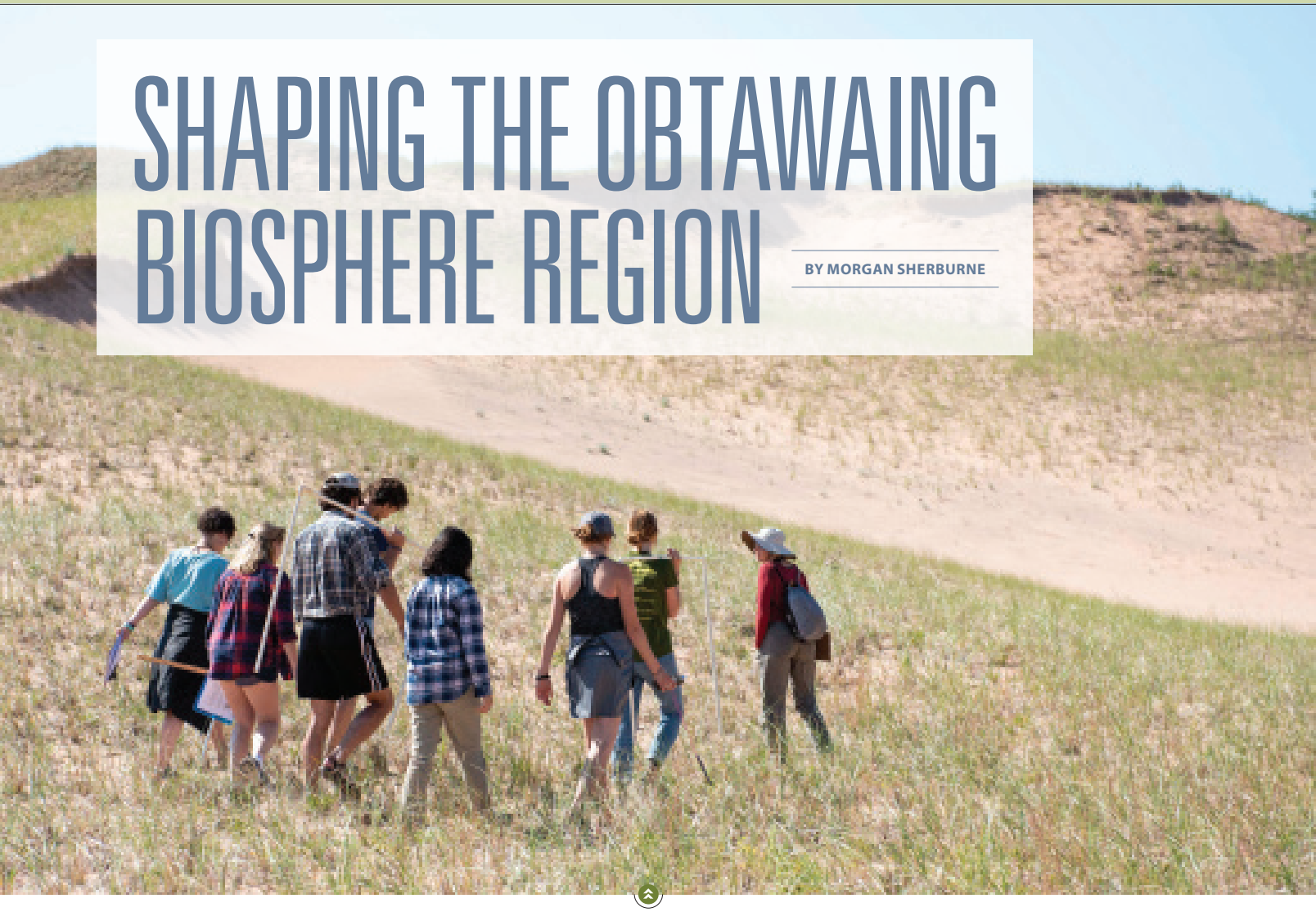
Postdoctoral Associate at the MIT Energy Initiative

Dr. Maryam Arbabzadeh develops models and tools to assess the sustainability implications of energy systems, employing computational programming, power system modeling, and life cycle assessment to provide industry stakeholders and policy-makers robust guidance for improvement. Her work is problem-focused, often relying on interdisciplinary partnerships to more effectively address challenging environmental problems.

"Currently, I think EVs and batteries are the main promising technologies. However, it is very critical to acknowledge that the environmental impact of EV use in terms of emissions reduction would have temporal and regional variations. We should avoid providing general statements about their environmental benefits without considering these changes."

SHAPING THE OBTAWAING BIOSPHERE REGION

BY MORGAN SHERBURNE



SEAS MASTER'S STUDENTS PERFORM FIELDWORK IN A FLAGSHIP NORTHERN MICHIGAN DUNE HABITAT. PHOTO BY ALEXIS RANKIN

"Obtawaing" is the Anishinaabemowin word for "at the halfway place."

It was the name for the center of the Odawa village that used to stretch 16 miles along northern Lake Michigan, near the town of Harbor Springs and the hamlets Good Hart and Cross Village, says Frank Ettawageshik, executive director of the United Tribes of Michigan and former tribal chairman of the Little Traverse Bay Bands of Odawa Indians in Harbor Springs.

Now, the word has been adapted to describe the Obtawaing Biosphere Region, a newly awarded designation springing from the U-M Biological Station (UMBS) in Pellston.

The designation is a renewal of UMBS' status as a UNESCO Biosphere Reserve, originally granted in 1979. The biosphere had included the 13,000 acres of lands managed by UMBS. Now, as the name Obtawaing reflects, the biosphere region includes the converging areas of two Michigan Peninsulas, three Great Lakes, and a diversity of cultures. It loosely spans Michigan's northern Lower Peninsula and southeastern Upper Peninsula, stretching from the Sleeping Bear National Lakeshore and across the Mackinac Straits to Sugar Island, near Sault Ste. Marie.

The redesignation effort was led by Knute Nadelhoffer, former director of the UMBS and professor emeritus in the U-M Department of Ecology and Evolutionary Biology. As Nadelhoffer and Adam Schubel, resident biologist at UMBS' Pellston campus on Douglas Lake, were beginning to grapple with UMBS' redesignation, Jon Allan was visiting a UNESCO biosphere reserve thousands of miles away, in Switzerland.

Allan, the academic and research program officer for SEAS, first learned of the UNESCO biosphere program when he traveled to Europe in his then-capacity as director of the Office of the Great Lakes. He visited Entlebuch, Switzerland's first UNESCO biosphere reserve, and looked at a map of biosphere reserves across the world.

"I saw three dots on the Great Lakes side of North America. One was at Isle Royale, one was at the U-M Biological Station, and one was in the Lake Champlain watershed, on the boundary of the Adirondack Park," Allan says. "I'm the guy who's supposed to understand the significance of the Great Lakes, and not just the biological and hydrogeophysical elements of the lakes, but the fish and the culture and our people—and I had never heard of these three places designated as internationally important areas."

Photo by Roger Hart/Michigan Photography

KNUTE NADELHOFFER, FORMER DIRECTOR OF THE U-M BIOLOGICAL STATION, LED THE REDESIGNATION OF THE OBTAWAING BIOSPHERE REGION.

At a 2018 meeting in Brockville, Ontario, of nine UNESCO Biosphere Reserves in the Great Lakes Basin, Allan reached out to Nadelhoffer to become involved.

UNESCO biosphere reserves consist of three interrelated zones. Each region has a core zone. This "strictly protected" zone is committed to the conservation of landscapes, ecosystems, species, and genetic variation. Obtawaing has several core zones, including the UMBS in Pellston; the UMBS Chase Osborn Preserve; and an array of land preserves protected by organizations including the Central Michigan University Biological Station on Beaver Island, Sleeping Bear Dunes National Lakeshore, sovereign tribal nations, and several land conservancies.

Radiating out from these core zones are buffer zones, or areas "used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training, and education." Obtawaing is unique among the world UNESCO biospheres for having numerous core areas where biological diversity is generated and sustained, Allan says.

"It's what I like to call the peppered landscape—it's pretty highly fragmented. It's not just Sleeping Bear National Lakeshore or the U-M Biological Station, but hundreds of both state and federal protected lands that will form the basis of a multiple core model," Allan says. "So then, the question becomes, what knits them together? I'm not just saying what physically knits them together, like a path or a trail. But what intellectually and spiritually knits them together?"

This knitted area is what UNESCO calls the third zone, or the transition area, where the program hopes to help communities "foster socioculturally and ecologically sustainable economic and human activities." It's a zone in which leaders of the program seek to foster humans' sustainable relationship to the environment they inhabit, and they enlisted SEAS graduate students to help document how people live and work in the region.

Photo courtesy of SEAS Master's Project Team

SEAS GRADUATE STUDENT DANIELA FERNÁNDEZ MÉNDEZ JIMÉNEZ; JON ALLAN, THE ACADEMIC AND RESEARCH PROGRAM OFFICER AT SEAS; AND SEAS GRADUATE STUDENT SAMUEL FREDERICKSON VISITED BEAVER ISLAND AS PART OF THEIR MASTER'S PROJECT.

Daniela Fernández Méndez Jiménez, Kate Montero, and Samuel Frederickson began working with Allan as part of their SEAS master's project. The students researched other biosphere regions and based on their research and visits to Northern Michigan, aim to provide possible organizational structures that Obtawaing can implement, Fernández says.

"What really drew me to this project is that it seemed like it was a microcosm of what we need to do in the world, which is to collaborate with partners, to figure out how to move forward when it comes to environment and sustainability—especially with partners who have different points of views and different experiences and organizations that approach things very differently," says Fernández, whose specializations are Behavior, Education, and Communication and Ecosystem Science and Management.

As part of their work on this project, the students joined Allan for tours of the Obtawaing Biosphere Region. They started in Cadillac, Michigan, and wound toward the Lake Michigan shoreline, making stops at sand dunes in Arcadia; the beach town of Elberta; Maple City and Cedar, where the students found a Polish community and cultural center; and over to Traverse City, renowned for its cherry orchards and wineries. During a second trip, the group visited Beaver Island and UMBS, as well as other towns and cultural sites in the Tip of the Mitt.

For Frederickson, the trip was a way to see in person the land he was mapping as his contribution to the project. Along with Allan, he is creating a repository of spatial data—maps of rivers, watersheds, roads, and other lands—that Obtawaing's partners can access and use.

"This is a project that will be going on beyond our time at U-M," says Frederickson, who is specializing in Geospatial Data Sciences and Ecosystem Science and Management. "We've just been helping to get it on its feet and getting it into a position that will be successful for however long Obtawaing exists—hopefully forever."

This is an edited version of an article that was originally published by Michigan News. It is reprinted with permission.

IZHI-MINOGING MASHKIKIWAN: PLACE WHERE MEDICINES GROW WELL

BY HALEY RILEY, MS '22

Recent graduate Eva Roos (MS/MLA '21) collaborated with the Cheboiganing Burt Lake Band of Ottawa and Chippewa Indians for her master's practicum, "Izhi-Minoging Mashkikiwan // Place Where Medicines Grow Well." She credits this collaboration to her time as a teaching assistant with Great Lakes Arts, Cultures, and Environments (GLACE), the U-M Biological Station (UMBS) humanities program.

Ingrid Diran, director of GLACE, and visiting professor Margaret Noodin, an Anishinaabemowin language holder and poet, helped Roos brainstorm how her master's practicum interests could be met: to bring Indigenous culture, aesthetics, and history into the field of landscape architecture. Noodin connected Roos with the Burt Lake Band, who were offered Roos' landscape architecture skills to use in a way that benefited their community.

The Burt Lake Band had built an office on their 20-acre headquarters in Brutus, Michigan, and were still deciding how to better relate the landscape to the building and their needs. They also were mourning the loss of Isabel Scollon, the Band's previous executive director, who envisioned this central gathering spot to be a "place of healing" for her people.

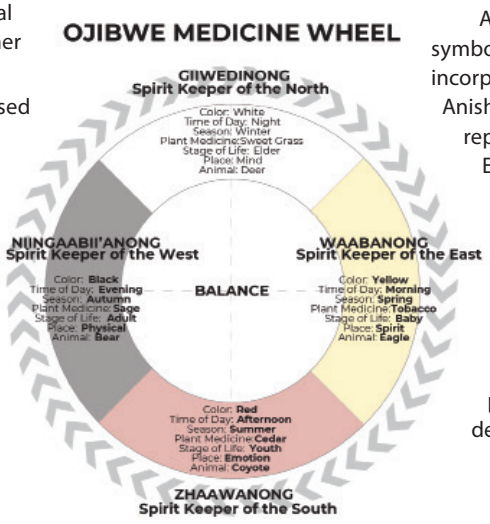
Tribal council members and Roos proposed a healing garden that would integrate the native plant knowledge, cultural beliefs and motifs, and traditional practices of the Anishinaabeg, a group of culturally related Indigenous people who span a variety of regions including Michigan, Minnesota, and Ontario.

The healing garden was named "Izhi-Minoging Mashkikiwan" in Anishinaabemowin or, translated to English by Noodin, "Place Where Medicines Grow Well."

The medicine garden is the main feature of the project, but Roos also worked on the Anamikaag Gitigaaning // Welcoming Garden, Wiingashkojimaanan // Sweetgrass Canoes, Giizhikikaaning // Cedar Grove, and Enji-Baashkaabiigwaning // Flowering Meadow. There is also a short- and long-term parking/overnight camping site.

The garden was a partnership, with Roos deferring to the Band for input and guidance to ensure that careful cultural integration and collaboration took place throughout every aspect of the garden design.

"It was so important that the underlying design concepts come from members of the Band," says Roos, who was advised by Dr. David Mitchner, curator of U-M's Botanical Gardens and Arboretum, and Nola Parkey, executive director of the Burt Lake Band. "To me, a successful design creates an experience where members of the Band see themselves in this landscape, and they can continually rediscover that identity and their culture and learn from this place together as a community."



A Medicine Wheel—a sacred teaching symbol in many Native American cultures—was incorporated into the healing garden. In the Anishinaabe traditions, the medicine wheel is represented as a circle with four even sections. Each section represents a different compass direction and color and is associated with other symbology. The Medicine Wheel also is apparent in the Burt Lake Band's flag, whose colors coincide with the wheel. This cultural meaning can be seen through Roos' integration of the 3D Medicine Wheel into the garden layout, as well as viewing each plant species as a bead that is a part of a larger design pattern.

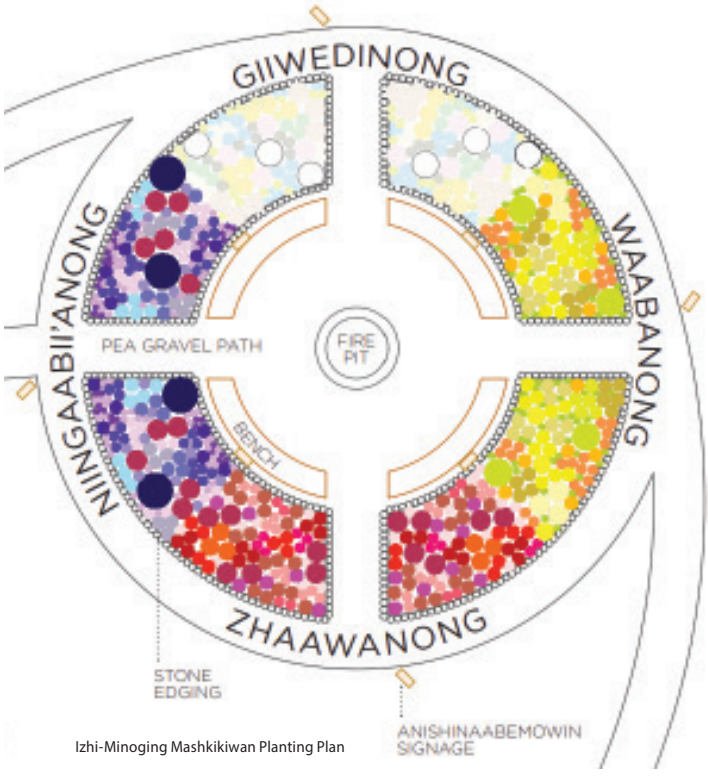
EVA ROOS' VISUAL CONCEPTION FOR ONE QUADRANT, ZHAAWANONG (THE SOUTH REGION), OF THE IZHI-MINOGING MASHKIKIWAN PROJECT. IMAGES COURTESY OF EVA ROOS

In addition, the Band expressed a desire for Wiingashk, a sacred plant in their culture (known in English as Sweetgrass), to be a part of Izhi-Minoging Mashkikiwan. "The sandy soil at the garden drains very quickly and changes which kinds of native plants make sense here. Sweetgrass is native to Michigan, but not this particular site, because it requires a lot of water in the soil," Roos notes. "A strategy that David Michener knew of involved sinking vessels in the ground that will trap the water and create a wetter microclimate in the contained soil. The idea of burying canoes arrived since it is an important instrument for water transport in Anishinaabeg culture."

The garden planting was finished in Summer 2021 and was a collective effort of Burt Lake Band members as well as friends, neighbors, Saginaw Chippewa Indian Tribe members, and the UMBS community. There is still a need for funding for signs in Anishinaabemowin and English detailing different cultural aspects of the site.

"Getting to know the people from the Burt Lake Band has been the most memorable and meaningful part of this collaboration," says Roos. "I can't describe how rewarding it is to see this community view this project and landscape as theirs."

LEARN MORE:
https://myumi.ch/WwEm9



Izhi-Minoging Mashkikiwan Planting Plan

NEW LIFE

FOR FABRIC WASTE IN DETROIT

BY LORI ATHERTON

Many people spent the early days of the pandemic learning a new skill or hobby.

Madeline Walker Miller, a new PhD student at SEAS, opted for a different path—starting her own sustainability-focused business in her hometown of Detroit.

Miller is the CEO of NexTiles, a textile recycling company that collects fabric waste from Detroit's auto manufacturing and fashion industries and converts it into low-dust, eco-friendly building insulation. A blend of recycled cotton and polyester, the insulation—called EcoBlow—is treated with a non-toxic, green coating that meets industry standards for heat resistance, flame retardation, and the ability to repel insects.

"Building insulation is one of the most cost-effective recommendations to reduce heating and cooling bills," says Miller, who is researching energy justice at SEAS. "In our case, it's a blown-in insulation that will be used in wall cavities, attic floors, and ceilings."

Miller's insulation is now in the product development and testing phase. After completing her first insulation prototype test in Fall 2020, she moved on to ASTM testing this past summer, with the aim of launching her product by the end of the year. She hopes to begin manufacturing EcoBlow in early 2022.

"Our goal is to capture a small percentage of the U.S. green insulation market," says Miller, whose initial focus is on the Detroit retrofit market. "Sixty percent of the housing stock in Detroit was built before 1970, making it a really great opportunity for insulation upgrades in the residential retrofit space. We'll focus on the Detroiters who need these insulation upgrades first, then eventually target new builds."

Miller's long-term strategy is to sell her sustainable insulation in big-box stores like Home Depot and Lowe's.

While NexTiles only uses cotton and polyester for its EcoBlow insulation, the company will collect any type of fabric waste—whether it's wool or pink spandex—and work with its network of business partners to find a secondary use for it. NexTiles employs several textile waste specialists who collect unused fabric from southeast Michigan businesses.

Miller learned about the global environmental problem of textile waste—approximately 80 percent of which ends up in landfills, she says—as a graduate student at the University of Miami Rosenstiel School of Marine and Atmospheric Science. While researching how plastic waste adversely affects oceans, Miller discovered that synthetic materials such as polyester and nylon contain small plastic fibers, or microplastics, that shed from clothing and wind up as ocean pollution. The microplastics are ingested by fish and other seafood that humans eat.

Through an internship at a New York-based textile recycling company called FABSCRAP, Miller saw how unwanted fabric could be recycled and reused for other purposes, including carpet padding and furniture lining. She began envisioning how she could bring a similar sustainability initiative to Detroit.

"I started my business because most people understand the negative impacts that plastic has on the environment," Miller says, "but a lot of people don't realize what fabric waste is doing to our air, water, and soil resources."

Miller, who comes from a "family of entrepreneurs," turned to her parents and siblings for help in getting NexTiles off the ground. Her mother is Carla Walker-Miller, the founder and CEO of Walker-Miller Energy Services, one of the largest African American and woman-owned energy waste reduction companies in the country.

Miller also completed TechTown Detroit's Start Studio, a business incubator, which she credits with giving her "the confidence to do the kind of outreach I needed to do in order to get NexTiles moving." That outreach included spending hours cold-calling 100 potential clients during the customer discovery phase, a nerve-wracking process for the self-described introvert.

Miller's hard work has paid off, as she now has a devoted clientele. She looks forward to the phone calls and emails she receives from them asking about product updates. "The amount of traction and interest in something that I started a year ago has been awesome to see," she says.

FLOODING IN DETROIT. PHOTO COURTESY OF MICHIGAN STATE POLICE EMERGENCY MANAGEMENT & HOMELAND SECURITY DIVISION

SEAS LAUNCHES SUSTAINABILITY CLINIC

Made possible through support from the Kresge Foundation—which has committed $1 million in funding over the next three years—the newly launched SEAS Sustainability Clinic aims to immediately improve the ability of the City of Detroit and nonprofits serving the City to address the impacts of climate change on the natural and built environment, human health, and the city's finances—while working to enhance sustainability policy and action.

While the Clinic's main emphasis will be on serving the community, the work also extends the mission of SEAS to promote multidisciplinary sustainability with a collaborative approach. "The Clinic was created to build long-term capacity and partnerships by embedding itself in the City of Detroit, while also boosting the local impact of the school's work and its collaboration on sustainability and equity," says Jonathan Overpeck, the Samuel A. Graham Dean and William B. Stapp Collegiate Professor of Environmental Education at SEAS.

Kerry Duggan (MS '06), former Obama-Biden White House deputy director for policy and currently an appointee to Gov. Gretchen Whitmer's Council on Climate Solutions, will serve as the Clinic's founding director.

"The focus of the Clinic is about responding to immediate and real problems for Detroiters," says Duggan.

In the effort to tackle residential flooding—an urgent concern for Detroiters—the Clinic will launch its inaugural partnership with Jefferson East Inc., a multi-service neighborhood organization that will complete an investigation of historical and recent flooding events that devastated the Jefferson-Chalmers neighborhood and adjacent communities.

Duggan notes that the Clinic will appoint a Diversity, Equity, and Inclusion (DEI) Leader in Residence to ensure that the principles and practices of environmental justice are integral to all Clinic projects, while serving as a valuable resource to the Clinic's clients.

The SEAS Sustainability Clinic in Detroit is part of an overarching statewide Sustainability Clinic initiative slated to launch in 2022.

CARTER RECEIVES NASA GRANT

Dr. Neil Carter, an assistant professor at SEAS, has received a three-year, $698,502 grant from the NASA Biodiversity and Ecological Forecasting program to research how changes in vegetation canopy and water stress in the western U.S. affect large mammal species.

The research, which will study mule deer, pronghorn antelope, bighorn sheep, and cougar, involves three key objectives, according to Carter, the principal investigator.

First, scientists at terraPulse Inc., a Washington, D.C.-based technology startup that specializes in applying artificial intelligence to satellite imagery, will develop ecological datasets on vegetation canopy and water stress using data collected by NASA sensors aboard the International Space Station. Second, scientists in the Western U.S. will compile information on animal habitat use, foraging, movement, mortality, and survival across portions of the Great Basin, Coast Ranges, Sierra Nevada, Rocky Mountains, Mojave Desert, and Colorado Plateau. Third, Carter and his colleagues will combine the NASA and animal data to predict how, and under what conditions, vegetation canopy and water stress influence animal fitness in complex, water-limited environments.

"These collaborations are important for addressing complex environmental and natural resource problems," notes Carter. "We will generate new knowledge that supports the efforts of wildlife management agencies to identify and manage critical habitat requirements for ecologically and economically important species in the western U.S., a region undergoing many changes."

SEAS OFFERS NEW GRADUATE CERTIFICATE FOCUSED ON CLIMATE CHANGE SOLUTIONS

Interdisciplinary solutions to tackle global climate change must be based on sound science and technology but also grounded in equity, policy, and social science. That's the philosophy behind the new Climate Change Solutions Graduate Certificate Program, which was co-developed by SEAS and U-M's Climate and Space Sciences and Engineering (CLaSP) program.

The 12-credit certificate is designed for graduate students who are enrolled in any U-M program. It gives students the basics of climate science and modeling, an understanding of the causes and consequences of climate change, and the technological tools to develop mitigation and adaptation strategies, according to Dr. Rosina Bierbaum, a professor and dean emerita at SEAS who co-created the program with U-M's engineering dean Dr. Alec D. Gallimore.

Because social, ecological, and economic health are intertwined, Bierbaum notes, students will learn to view climate change solutions as a way to enhance all three.

"We don't want students to have a siloed view of technologies or basic science or climate modeling, but to view the problem and the solutions through an inclusive lens of equity and sustainability, and to understand the policy implications of actions to combat climate change," Bierbaum says. "We want to develop systems thinkers or 'civic scientists' who can take science and technology information and design feasible, socially acceptable, and equitable solutions to climate change."

While other universities offer certificates that focus on climate change from either a science or technology perspective, Bierbaum says U-M's certificate is unique in that students get "an integrated soup-to-nuts education on all aspects of climate change, from causes and solutions to policy and equity."

That integrated approach is an extension of SEAS' overall mission, Bierbaum notes. "From our very roots 120 years ago, our school's multidisciplinary mission has promoted work at the intersection of disciplines. Interdisciplinary solutions have to be found quickly to sustain the life support system of the planet."

Learn more: seas.umich.edu/academics/graduate-certificate-programs

12
CREDITS

3
CORE COURSES

SEMINAR IN ENERGY SYSTEMS, TECHNOLOGY, AND POLICY

CLIMATE CHANGE AND INTERDISCIPLINARY APPROACH TO PROBLEM SOLVING

RESILIENCE SOLUTIONS: CLIMATE ADAPTATION FROM GLOBAL TO LOCAL

1
ELECTIVE

10 QUESTIONS: DR. MEHA JAIN

Assistant Professor Dr. Meha Jain's research examines the impacts of environmental change on agricultural production and strategies that farmers may adopt to reduce negative impacts. She does this by combining remote sensing and geospatial analyses with household-level and census datasets to examine farmer decision-making and behavior across large spatial and temporal scales.

1. WHAT IS THE MOST ADVENTUROUS THING YOU'VE EVER DONE?

After my junior year of college, I spent a summer in Kenya doing research on how livestock grazing was affecting wildlife in the region. It was exciting because I drove a Jeep between the field station where I was staying and the field site where I worked, and it felt like a personal safari every day. I would see giraffes, elephants, and other wildlife walking by. One time we were driving back to the field station when somehow, we got stuck between a mother elephant and her baby, and the mother started trumpeting her horn. We weren't sure what to do because she was blocking the road, so we just waited. We sat there for maybe an hour and finally she calmed down and walked away.

2. WHAT IS YOUR GUILTY PLEASURE?

I have a toddler at home and almost no free time. Sometimes I procrastinate going to bed even though I know it's a terrible idea and binge on a new Netflix show. The latest is "The Chair," which thankfully did not remind me of my experience in academia.

3. WHAT IS YOUR FAVORITE SEAS MOMENT?

It is hard to pick one moment, but the thing that I really appreciate about SEAS is the interdisciplinary and diverse research everyone is doing here. Sometimes I need to think about theories or questions from other disciplines, and there's always someone within the building who is interested in collaborating. I think that's what is so great and unique about SEAS.

4. WHAT IS THE GREATEST PIECE OF ADVICE YOU HAVE EVER RECEIVED?

The greatest advice I have ever received is that everything you experience is something that you can learn from, even if you feel like it's a negative experience. I try to view any kind of failure or setback as a situation that I can learn from.

5. WHAT DID YOU WANT TO BE WHEN YOU WERE A KID?

I wanted to be a marine biologist. I've always been interested in nature and wildlife, and I thought it would be exciting to go deep into the ocean and see animals that most people will never see in their natural habitat. Over time I realized I was much more interested in understanding people's relationships with the environment and decision-making around natural resource use.

6. FAVORITE OR MOST DESIRED VACATION DESTINATION?

I would love to travel to the Amazon, particularly Brazil. I have friends who are working in the area and the rainforest sounds incredible.

7. DESCRIBE YOUR FIRST JOB.

My first job was in high school, working with a chemistry professor in his lab at the University of Notre Dame. At the time I didn't have the skills to do research, so I just washed all the dishes used in the lab. It was boring but it was also nice because I got some experience interacting with a lab and seeing what research is like.

8. WHAT IS YOUR BIGGEST FEAR OR PHOBIA?

My most irrational fear is driving. I'm a terrible driver and it seems like every time I get behind the wheel (every few months), I get in some sort of accident. So, I try to avoid driving as much as possible.

9. WHO IS YOUR BIGGEST HERO/INSPIRATION?

The person who has had the most influence on me in terms of being a role model is my dad. He grew up in a village in India with almost nothing. Through hard work and determination, he was able to get a job in Canada and then the U.S. and created a better life for us. He always said, "If you work very hard, things will work out," and that's something that has always stuck with me.

10. WHAT'S YOUR FAVORITE HOBBY?

I love running as a way to unwind and clear my head.

SEAS STUDENT DOLORES PERALES RECEIVES STATEWIDE YOUNG CLIMATE LEADER AWARD

Dolores Perales is the inaugural winner of the Young Climate Leader Award, given by the Michigan Climate Action Network. She is pursuing a dual master's degree in environment and sustainability (SEAS) and urban and regional planning (through U-M's Taubman College). Her specialization at SEAS is Environmental Justice.

Perales, a first-generation college student, grew up in southwest Detroit surrounded by vacant land, blighted property, illegal dumping, and noise and air pollution. "I didn't start putting the pieces together until I got older, that these environmental factors impact how I live and the quality of my life," says Perales, who has severe asthma. In high school, she began volunteering with Cadillac Urban Gardens, part of the Southwest Detroit Environmental Vision Project (SDEV). She continued working there throughout college and now is their environmental sustainability specialist—a full-time job on top of her graduate studies at the University of Michigan.

With Sarah Clark (MUP '15), Perales co-manages SDEV's farms and orchard, including coordinating volunteers and working with the community to teach sustainability. Clark and other Taubman College alumni inspired Perales's career path and introduced her to U-M; now Perales is doing the same for the youth and interns she mentors. "Environmental factors tend to be left out of the planning process, as well as the needs and wants of the community—especially frontline communities and communities of color like mine—so I am going into this field to make sustainable, equitable change," says Perales. "Having that deeper connection with interns because of the level playing field of our backgrounds shows them what is possible. And it reminds me that I need to work and study hard so I can continue to navigate these spaces in a way that makes life better for them in the future."

The Michigan Climate Action Network is comprised of more than 70 organizations and 30,000 individuals and partners with many coalitions and campaigns working for climate solutions and justice. The organization's mission is to connect and amplify individuals, communities, and organizations confronting the climate crisis in Michigan and support them in advancing equitable climate solutions with the urgency science demands for the environment and all that live in it.

The inaugural Michigan Climate Awards recognize Michiganders doing exceptional work in these areas. The Young Climate Leader Award goes to a student or other young person going above and beyond as a volunteer or individual.

One of the many people who nominated Perales wrote, "As a classmate of Dolores', I've learned so much from her, and watch her work tirelessly to fundraise and promote events that educate our community. She is an inspiration and deserves the Young Climate Leader award." *—Amy Spooner*

This article originally appeared on the U-M Taubman College website and is reprinted with permission.

LEARN MORE:
energyequityproject.com

FIRST STANDARDIZED TOOL FOR DRIVING EQUITY IN CLEAN ENERGY INDUSTRY

The Urban Energy Justice Lab at SEAS has begun a new program aimed at measuring whether clean energy programs are being distributed equitably to those who need them most.

The Energy Equity Project—a partnership between SEAS and the Energy and Joyce foundations—will create the first standardized tool for collecting and tracking data to improve equity in clean energy policies, programs, and investments, including how easy it is to access clean energy services in frontline and Black, Indigenous, and People of Color (BIPOC) communities that are burdened by disproportionately high energy costs and pollution.

One of the key goals of the tool, called the Equity Measurement Framework, is to measurably improve the clean energy benefits that BIPOC and frontline communities receive, including lower energy bills, cleaner air, green jobs, resilience to climate impacts and power outages, and ownership of renewable energy systems and electric vehicles.

"Our objective is to ensure that the voices of frontline communities are not only heard, but are prominent," says Justin Schott (MS '06), project manager, "and that they are not only the recipients, but the architects of an equitable clean energy future."

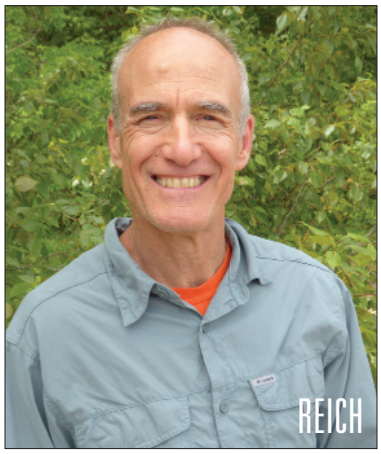
A beta version of the Framework is set to launch in 2022. Envisioned as an "off the shelf" guide, the Framework will consist of a set of text documents, spreadsheets, and an interactive website with user support provided via phone and email.

DIRECTORS NAMED FOR SEAS INSTITUTES

New directors have been named for the Cooperative Institute for Great Lakes Research (CIGLR) and the Institute for Global Change Biology (IGCB) at SEAS.

Dr. Gregory Dick, a professor in the Department of Earth and Environmental Sciences in U-M's College of Literature, Science, and the Arts, joined the SEAS faculty as CIGLR's director. Dick has been on the U-M faculty since 2008. His early work at Michigan focused on microbial ecosystems at deep-sea vents, studying how these organisms thrive in extreme environments and, in turn, influence the flux of bio-essential elements from vents to the ocean. The discovery of sinkholes in Lake Huron that harbor chemosynthetic communities similar to those at deep-sea vents piqued his interest in the Great Lakes. That initial sinkhole research—combined with an appreciation of cyanobacteria's crucial role in Earth's chemistry and biology gained through teaching undergraduate geobiology—spurred an interest in cyanobacteria that drives Dick's current work, which focuses on answering critical questions about the causes of cyanobacterial bloom toxicity using cutting-edge omics techniques.

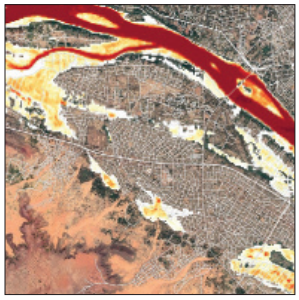
Dr. Peter Reich, a renowned expert in forest ecology, has been named director of the IGCB. Reich, who has conducted global change research on plants, soils, and ecosystems across a range of scales, comes from the University of Minnesota. He previously was the chief scientist at the Hawkesbury Institute for the Environment at Western Sydney University in Australia from 2011 to 2021. He is a member of the National Academy of Sciences of the United States and the American Academy of Arts and Sciences, a fellow of the Ecological Society of America, and a BBVA Prize Laureate (BBVA Foundation Frontiers of Knowledge Award in Ecology and Conservation Biology). The IGCB's vision is to develop comprehensive understanding of the interactive effects of global change on organisms, ecological, and coupled social-ecological systems across temporal and spatial scales.



RESEARCH HIGHLIGHTS

MUNICIPAL TAKEOVERS AND DRINKING WATER

Six of the 11 Michigan cities that have come under state emergency management since 1990 saw changes to their municipal drinking water systems, the most common being rate increases, water shutoffs for nonpayment, and the privatization of water services or infrastructure. That's one of the findings of a study that used Michigan cases to assess the predictability and rationality of municipal takeovers by states, as well as the consequences for public services such as drinking water systems. **Dr. Sara Hughes**, an assistant professor at SEAS, was the lead author of the study, which was published in the journal *State and Local Government Review*.



FLOODS INCREASINGLY IMPACT WORLD'S POPULATION

New research in the journal *Nature* used direct satellite observations of floods to reveal that the proportion of the world's population exposed to floods has grown by 24% since the turn of the century—10 times higher than scientists previously thought—due to both increased flooding and population migration. "We found that economic development and people moving into flood-prone areas is significantly increasing the number of people exposed to floods in those regions. Furthermore, increasing flood exposure is rooted in underlying conditions that give vulnerable populations no choice but to settle in flood zones," said study co-lead author **Dr. Jonathan Sullivan**, who earned a doctorate this year from SEAS.

IS REUSABLE ALWAYS BEST?

Consumers likely assume that reusables have fewer environmental impacts, but just how green are these products? U-M researchers, including **Dr. Shelie Miller**, an environmental engineer at U-M's Center for Sustainable Systems, compared the lifetime environmental impacts of common kitchenware products—both single-use plastics and reusables—and uncovered some surprising and counterintuitive results. The researchers looked at consumer kitchenware products in four categories: drinking straws, sandwich bags and wraps, coffee cups, and forks. They found that some reusable alternatives never manage to reach that break-even point because of the energy and water used each time a reusable item is washed. The study was published in the *International Journal of Life Cycle Assessment*.

DIGITIZING FISH RECORDS

U-M researchers are enlisting the help of citizen scientists in a new project to digitize thousands of historical records—some dating back more than a century—about Michigan inland lake conditions and fish abundances. Scientists will feed the digitized data into computer models to study the impacts of climate change and other factors on the fish in Michigan's inland lakes. "Starting more than a century ago, lake surveys have been used to understand how fish were distributed across the state, which lakes would support sport fishing, and how lakes should be managed," said project co-leader **Dr. Karen Alofs**, an aquatic ecologist and an assistant professor at SEAS. "Digitizing this historical data will allow us to analyze trends in fish communities over time and to relate those trends to a warming climate and to other environmental changes and management decisions."

MLA FACULTY RECEIVE ASLA PROFESSIONAL AWARDS

Professor Joan Nassauer, FASLA, and Lecturer Amanda Szot (MLA '01) have been honored with 2021 American Society of Landscape Architects (ASLA) Professional Awards.

Nassauer received an Honor Award in Research for her project, "Addressing Systemic Inequities in Neighborhood Greenspace: Leveraging Green Stormwater Infrastructure Design Elements to Enhance Well-Being." It addressed the relationship between greenspace and residents' well-being in Detroit neighborhoods struggling with widespread vacant property.

Szot and the project team in the Salt Lake City, Utah, office of Design Workshop Inc. received an Award of Excellence in General Design for their project, "Natural History Museum of Utah: A Museum Without Walls." The museum utilized sustainable design elements including rainwater recapture, permeable surfaces, and native plantings that resulted in a landscape that mimics and restores the natural conditions of the environment and the site.

ASLA Professional Awards are among the most prestigious awards in the profession and are given to only the most exceptional projects in the field. This year, 31 projects were recognized.

PitE GRAD JULIE CARTER PUBLISHES STUDY ON PUBLIC HEALTH AND CLIMATE CHANGE IN MICHIGAN

Transforming an undergraduate honors thesis into a published paper is a praiseworthy—but seldom realized—ambition in academia, but that's exactly what master's student Julie Carter (BS '19) accomplished before beginning her first semester at SEAS. The Program in the Environment (PitE) grad is the lead author of "Assessing perceptions and priorities for health impacts of climate," published in the *Journal of Environmental Studies and Sciences* in April 2021.

In their study, Carter and the research team conducted an online survey in partnership with the Michigan Association for Local Public Health. Their goal was to assess how local health departments (LHDs) in Michigan perceive the impacts of climate change on public health—and how well they understood the related resources available to them from state and federal agencies.

"More than three quarters of the Michigan local public health officials agreed climate change will impact health in their jurisdictions; however, only a third of officials agreed that climate change is a priority in their departments," the researchers write. "Uncertainty regarding the resources available to local public health officials may hinder LHDs from developing necessary preparedness, so meeting this need could bolster the public health response to climate change."

Study co-authors include Dr. Patricia Koman, a research investigator in environmental health sciences at the U-M School of Public Health, and Dr. Jason Duvall (MS '05, PhD '10), a postdoctoral researcher, lecturer, and concentration advisor in PitE.

WEGE LECTURE FEATURES NATIONAL CLIMATE ADVISOR

GINA MCCARTHY

In order to motivate people to address climate change, you need to speak about it in "human terms," says Gina McCarthy, the country's first National Climate Advisor, during the Oct. 14 Peter M. Wege Lecture on Sustainability. "Let's talk about climate change solutions as a way to advance human beings, not just their air quality." She adds that it's important to be "intentional" in making sure that everyone, including underserved communities, benefits from climate change solutions. "We need to invest in major infrastructure like our water systems if we want to be able to respond to people's needs today," she says. "There are people in the United States of America who don't have access to clean water. How dare we be in this position today?" Nearly 800 participants tuned in virtually to the 19th annual Wege Lecture, which was hosted by SEAS and the Center for Sustainable Systems to commemorate the center's 30th anniversary.

PICTURED TOP ROW (LEFT TO RIGHT): AJ CONVERTINO, MUHAMMAD ABDULLAH, CHELSEA JOHNSON, AND EVAN GONZALEZ; MIDDLE ROW (LEFT TO RIGHT): JESSICA MILLER, ANNIE LINDEN, PETER SICILIANO, AND SARAH COLLINS; BOTTOM ROW (LEFT TO RIGHT): AVIK BASU, EMILY JOHNSON, KRISTINA CURTISS, AND LAUREN BALOTIN. NOT PICTURED: NAOMI BARKER AND NATASHA DACIC.

COP 26 DELEGATION

SEAS and other U-M students attended the recent United Nations Climate Change Conference, also known as COP 26, in Glasgow, Scotland. Delegates from nearly 200 countries gathered for the summit, described by some as a make-or-break chance to curb greenhouse gas emissions and stave off the worst ravages of climate change. U-M attained observer status in 2009, and students and faculty have attended every year as observer delegates. A course, provided in the fall term and led by Professors Avik Basu and Richard Rood, prepares student delegates and others interested in the climate summit.

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

'YEAR OF COVID' PHOTO CONTEST WINNERS

Throughout the pandemic, we've all drawn inspiration and comfort from places a little closer to home, whether it's hiking outside, visiting a new park, or tackling a new recipe in the kitchen. We asked the SEAS community where their adventures have taken them in the past year, and which places or projects left a footprint on their soul. Here, we share the winning entries in our "Year of COVID" photo contest. Thanks to everyone who submitted images of the people, places, and things that brought them joy and renewed their spirit.

1st

Justin Schott (MS '06) & Jennifer Janssen (MS '08)

SCHOTT FINALLY GETS TO MEET A KINDRED SPIRIT IN THE CASCADES.

2nd

María Dabrowski (MS '22)

I HAD THE PLEASURE OF PHOTOGRAPHING THIS BEAUTIFUL BIRD, GOOKOOKO'OO/ GREAT HORNED OWL (ANISHINAABEMOWIN/ENGLISH), NEAR MY HOME LAST WINTER. PHOTO TAKEN ON TRADITIONAL ANISHINAABEK LAND.

3rd

Scott Bertschy, SEAS Development and Alumni Relations

AN EVENING IN FALL 2020 ON THE BOARDWALK IN THE ARCADIA MARSH NATURE PRESERVE IN ARCADIA, MICHIGAN.

CLASS NOTES

Stephanie Austin (BS '10, MLA '13) and her team at Quinn Evans won a 2021 Honor Award in Analysis and Planning from the American Society of Landscape Architects for the project, "Indian Mounds Regional Park Cultural Landscape Study."

Elizabeth Chong Baskerville (BS '07, MS '14, MLA '16) was profiled by the Landscape Architecture Foundation as part of its Perspectives series, which highlights landscape architects from diverse backgrounds. She is the owner of earthling design LLC in Seattle.

Catherine (Simmons) Benson (BS '96) has joined the law firm of Simms Showers LLP as an associate. She specializes in admiralty and commercial litigation representing domestic and international clients

Laurence J. Choinard (BS '76) reports that he is retired and "living the good life up north, hunting, fishing, shooting, and riding my bike."

Allison Clements (BS '98) was sworn in as a commissioner of the Federal Energy Regulatory Commission in December 2020. She will serve a four-year term. Clements has two decades of public and private sector experience in energy regulation and policy, representing utilities, independent power producers, developers and lenders, nonprofits, and philanthropies on grid-policy issues.

M. Rupert Cutler (BS '55), who previously served as the U.S. Assistant Secretary of Agriculture for Natural Resources and Environment under President Jimmy Carter, has donated papers from his environmental career to the Virginia Tech Special Collections and University Archives. The collection documents Cutler's environmental, political, and business activities prior to and following his service in the Carter administration. He lives in Roanoke, Virginia.

Kerry Duggan (MS '06) was appointed to the Secretary of Energy Advisory Board (SEAB) by Secretary of Energy Jennifer M. Granholm. SEAB will provide advice and recommendations to help the Department of Energy achieve its clean-energy goals. In addition, Duggan, **Lauren Cooper (MS/MUP '12)**, and **Charlotte Jameson (MS '14)**, along with **SEAS Dean Jonathan Overpeck** and **SEAS Professor Sam Stolper**, were appointed to the Council on Climate Solutions by Michigan Gov. Gretchen Whitmer. The Council acts in an advisory capacity to the governor and the Michigan Department of Environment, Great Lakes, and Energy to formulate and oversee the implementation of the Michigan Healthy Climate Plan, which will serve as the action plan for the state to reduce greenhouse gas emissions and transition toward economy-wide carbon neutrality.

Julia Elkin (MS '15) is a Sea Level Rise Planner with the County of Marin Community Development Agency. As part of the County's Advance Planning team, she helps local communities address current and future coastal hazards through adaptation planning programs and projects that address human health and safety, critical infrastructure, ecological systems, and equitable open space access. Current projects include managing the Stinson Beach Adaptation and Resilience Collaboration, a multi-year process engaging diverse stakeholder input on sea-level rise adaptation pathways for the town of Stinson Beach.

Andy Giarrizzo (MLA '83), who worked as an associate landscape architect for the New York State Parks Niagara Region, retired in December 2020. "My career was a triumph!" he writes. "I persevered in a rigorous MLA program that required me to learn skills I never had. With time and the right experience and more perseverance, I accomplished what I set out to do. Luck, time, freedom to make choices, and some street smarts helped, too. A couple of 'godfathers' along the way also helped."

Dale Hauke (BSF '77, MF '81) is vice president of Urban Mining Industries, "which has commissioned the first manufacturing plant of its kind in the world to convert dirty waste glass that would otherwise be landfilled into a ground-glass pozzolan." Trade named Pozzotive, it is made from 100 percent recycled post-consumer glass and is described as a "safer, sustainable, and higher-performing material that dramatically reduces embodied carbon dioxide emissions in concrete."

Collin Knauss (MS '19, MBA '21) joined the Great Lakes Protection Fund as its Project Development Manager in September. In his role, Knauss will lead the Fund's project development efforts, spotting new opportunities and launching new approaches to improve the health of the Great Lakes and its communities. Prior to graduate school, Knauss worked as the Youth Programs Manager for National Park Trust, an environmental NGO that acquires and preserves parkland and engages the next generation of park stewards through its youth program initiatives; while there, he addressed equity and inclusion challenges by connecting under-resourced youth to outdoor education opportunities.

Chris Kolb (BS '82), who previously served as Michigan Gov. Gretchen Whitmer's state budget director, was appointed vice president for government relations at the University of Michigan. Kolb has more than 20 years of experience in public service both in the government and nonprofit sectors, including three terms in the Michigan House of Representatives.

Yu-De Lee (MS/MAE '14) is the founder and CEO of Tsaitung Agriculture, a platform that helps restaurants purchase vegetables and fruits directly from farmers. It was named one of the top food and beverage start-up companies in Taiwan by BestStartup.Asia.

Derek Martin (MS '17) has taken a new role as the Sustainability Program Manager at the University of California, Santa Cruz. In this role, he will focus on zero waste, food, procurement, and health and wellness initiatives. He previously served as the Sustainability Coordinator—and then as the Assistant Director of Sustainability—at Susquehanna University in Selinsgrove, Pennsylvania.

Trisha Miller (BA '98) is now the Chief Innovation and Development Officer at Elevate, a national organization focused on "making the clean energy economy accessible to everyone." Her role supports Elevate's federal policy work and facilitates its presence as a federal partner of the Biden administration's Justice40 Initiative. Previously of Gates Ventures and the U.S. Department of Housing and Urban Development, Miller is an expert in climate and energy solutions, clean manufacturing, and sustainable housing.

Amisha Parekh (MS/MBA '07) joined Blackstone as the global head of ESG for private equity. She previously worked at Bloomberg, where she led ESG data acquisition and curation within Bloomberg's Sustainable Finance Solutions team.

Dr. Peter Perschbacher (BS '68) retired in 2012 as an associate professor in the Department of Aquaculture and Fisheries at the University of Arkansas at Pine Bluff. He is the co-editor with Robert Stickney of *Tilapia in Intensive Co-Culture* (Wiley-Blackwell, 2017), now in 163 libraries worldwide. The book is the culmination of 44 years of research on increasing the sustainability of aquaculture by employing the filtering ability of tilapia to improve water quality. He credits U-M professors John Bardach and Karl Lagler, as well as former U-M classmates, for helping to shape his career direction.

John Petoskey (MS/JD '20) was appointed by Michigan Gov. Gretchen Whitmer to the Climate Justice Brain Trust, which will help to identify barriers that impede environmental justice communities from realizing the benefits of the energy sector's transition to cleaner energy sources.

Devon Danz Preston (MS '03) was appointed to the Connecticut College Board of Trustees in July 2021. Since 2014, Preston has worked with children living in foster care as a court-appointed special advocate with Marin CASA. Her professional career has primarily focused on the environment and sustainable development. She has held positions as an environmental program officer with the Rhode Island Foundation, executive director of the Washington County Regional Planning Council, environmental compliance officer and sustainability manager with the Presidio Trust, and with the National Audubon Society.

Dr. Ashley Rust (BS '95, MS '99) was featured on the cover of the Summer 2021 issue of *Trout Unlimited* magazine and was interviewed for the article, "Fish and Fire in the West." A research associate at the Colorado School of Mines, her research focus is on fish, wildfires, and stream restoration.

Sue Shink (MS '95) is chair of the Washtenaw County Board of Commissioners. A county commissioner since 2019, she has been leading climate action work in Washtenaw County. She is a founding member of the Environmental Council, has been instrumental in galvanizing support for climate action planning, and will oversee a one-third reduction in carbon emissions from county operations by the end of 2021.

Morgane Treanton (MS '12) welcomed her daughter, Armelle, on April 9, 2021. She joins her older brother, Ryan, who is 2 years old. Treanton is an economist/energy analyst in the Electric Power Division of the Massachusetts Department of Public Utilities.

Photo: Josh Duplechian

IN MEMORIAM

Paul W. Johnson (BS '66, MS '70), a farmer and a state and national leader in the movement to conserve America's soil and water, died February 15, 2021, at age 79 in Decorah, Iowa. Both of his degrees from U-M were in forestry. According to the *Des Moines Register*, Johnson served as the director of Iowa's Department of Natural Resources from 1999 to 2000 and as the chief of the U.S. Department of Agriculture's Natural Resources Conservation Service from 1994 to 1997. He also had been a Democratic state legislator, serving in the Iowa House from 1985 to 1990. Among his achievements, the *Register* noted, he co-wrote the Iowa Groundwater Protection Act, which is landmark state legislation to stop contamination of Iowa's water from underground tanks and surface pollutants. He also was an architect of Iowa's Resource Enhancement and Protection Program, which provides money for parks, trails, and wildlife enhancement, among other projects, across Iowa. Johnson is survived by his wife, Pat; sons, Andy and Eric; daughter, Annika; and six granddaughters.

WHERE ARE THEY NOW?

SNREdNation Calendar Models

Remember the 2015 SNREdNation calendar that featured students poking fun at environmental stereotypes? Several of those calendar models provided updates on what they've been doing since graduating from the school. Read on to see how these alumni are putting their environmental degrees to good use.

CAWLEY, LEFT, WITH DANIA GUTIERREZ (MS '15)

SARA CAWLEY (MS '15)

Where do you live?

Washington, D.C.

Current job:

Legislative Representative at Earthjustice, a nonprofit environmental law organization. I work on the Policy and Legislation Team, where I lobby Congress and the administration on federal oil and gas policy issues.

Favorite SNRE/SEAS memory:

All of the school's traditions: Orientation at the U-M Biological Station, Student Government Bar Crawl, tailgates, Campfire, Solstice Party, Food Olympics, and Sustain-A-Ball.

JENNY HEBERT (BA '09, MLA '15)

Where do you live?
South Lake Tahoe, California.

Current job:
I am the landscape architect for the Eldorado National Forest. I design and oversee construction of recreation facilities ranging from campgrounds and day-use areas to bike trails and visitor centers. I am also the forest accessibility coordinator, scenic resource specialist, and graphic designer for informational signs and messaging.

Favorite SEAS/SNRE memory:
Every minute of being the Saginaw Forest Caretaker.

IAN ROBINSON (BA '08, BBA '08, MS/MBA '17)

Where do you live?
Detroit.

Current job:
President/COO of BlueConduit. Our machine learning software helps drinking water systems locate their lead service lines.

Favorite SEAS/SNRE memory:
Log-sawing at Campfire.

ROBINSON, LEFT, WITH WW BRANDVAIN (MS '15)

ALI SHAKOOR (MS '14)

Where do you live?
Dearborn Heights, Michigan.

Current job:
I am currently a PhD student at Wayne State University, studying the effects of Microcystis exposure on the early-life history of walleye. I'm also doing some work with microplastics exposure on aquatic macro-invertebrates.

Favorite SEAS/SNRE memory:
The strong sense of community I felt while in the Dana Building. I miss it and have yet to encounter it to that degree anywhere else.

SHAKOOR, LEFT, WITH KARL BOSSE (MS '16) AND RICKY ACKERMAN (MS '16)

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THE CLASS OF 2023 POSES FOR A GROUP PHOTO ON THE RACKHAM STEPS DURING ORIENTATION

ARE YOU CONNECTED?

SEAS Connect is a monthly e-newsletter that brings alumni, students, faculty, and friends even closer together. In every issue, you'll read about what your classmates are up to, hear from your favorite professors, find out what's going on in the Dana Building, and learn how to get involved. Subscribe or update your email address now by contacting seas-alumni@umich.edu.

SHARE YOUR NEWS!

Send us updates and photos about your new job or personal achievements. Visit seas.umich.edu/alumni and fill out an online update form or write to us. We look forward to hearing from you and sharing your news.

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