

Fall 2022

M | SEAS

Stewards

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

Northern Michigan:

The Beauty
of Resilience

Plus:

Fostering Human-Tiger
Coexistence in Nepal

Developing Water Policy Solutions
That Ensure a Just and Resilient Future

Northern Michigan: The Beauty of Resilience

Northern Michigan. There's nothing more beautiful than a Lake Michigan sunset that ushers in a starry night. Or the vibrant red and orange hues of fall foliage as far as the eye can see. Whether you love lazy, sunny days at the lake, hiking the dune trails or snowshoeing in a wintry wonderland, we all can agree that protecting our incredible natural resources in Northern Michigan is imperative—now and for generations to come. Here at SEAS, we are focused on research, education, engagement and impact in Northern Michigan, with the goal of preserving this place we so dearly love. From the fish that live in our lakes and rivers to the giant towering trees in our forests, from solar gardens and agriculture to coastal shorelines, we are focused on tackling the climate crisis across every aspect of life and protecting the ecosystem services we rely on for a thriving economy, countless jobs and a healthy quality of life. You can read about some of our Northern Michigan work in this issue's cover story, "Northern Michigan: The Beauty of Resilience," which begins on p. 10. We are united in our love for "Pure Michigan" and the Great Lakes, and we are poised to meet the future with strength and resilience.

CADILLAC SOLAR GARDENS IN CADILLAC, MICHIGAN. PHOTO BY MADDIE FOX





Dear Friends:

Last August, my partner, Julie, and I took our kids on a family vacation to Iceland. With our daughter in high school and our son at U-M, we learned that we had to go “big” with our trips if we wanted the kids to come along. Some of you, I’m sure, can relate.

Humor aside, Iceland was even more majestic than I could have imagined—and certainly a dream trip for Julie and me, who are geologists turned climate scientists. As I took in the glaciers and ice caps and saw Earth’s crust being formed (hot lava!), I was reminded yet again about how vast our planet is and how there is still so much to admire and be amazed by in this beautiful world. And, how much is at stake.

Closer to home, the U-M Board of Regents had their own travels—to Northern Michigan, where they experienced firsthand U-M’s impact, engagement and research in our wonderful state. It is astounding to me the collective impact our SEAS faculty, alumni and students make up north—from vital research about fish and invasive species to land conservation and the study of soil and pollinator habitats near solar fields. You can read more about SEAS’ contributions in Northern Michigan within these pages of *Stewards*, where we also highlight tiger conservation and water policy and share an excerpt from esteemed Professor Emeritus Bunyan Bryant’s memoir.

I left Iceland with renewed hope that our planet will thrive for generations to come—despite climate change and the other pressing environmental issues we are facing. That’s because the work we do as a SEAS community is together; none of us is alone in our efforts to build a more just, sustainable future.

The work you do makes a difference, and I’m grateful for your support and partnership.

Be well, and Go Blue!

Jonathan 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.



M | SEAS Stewards

A magazine for alumni and friends of the School for Environment and Sustainability and the Program in the Environment.

Cover photo of Baldy Dune, part of Arcadia Dunes: The C.S. Mott Nature Preserve, by Maddie Fox.

Samuel A. Graham Dean
Jonathan T. Overpeck

Associate Dean for Academic Affairs
Michaela T. Zint

Associate Dean for Research and Engagement
Bill Currie

Executive Director of Development and Alumni Relations
Scott C. Bertschy

Executive Director, Communications, Marketing and Outreach
Carole Love

Editor
Lori Atherton

Project Manager
Katie Trevathan

Writers
Lori Atherton, Jim Erickson, Nayiri Mullinix, Kim Peacock, Juliette Quenioux, Denise Spranger

Design and Photography
Dave Brenner, Maddie Fox

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Contact Information

School for Environment and Sustainability
University of Michigan
440 Church Street
Ann Arbor, MI 48109
734.764.2550
seas.umich.edu

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SEAS acknowledges the university's origins through an 1817 land transfer from the Anishinaabek, the Three Fires People: the Odawa, Ojibwe, and Bodewadami as well as Meskwahkiasahina (Fox), Peoria and Wyandot. We further acknowledge that our university stands, like almost all property in the United States, on lands obtained, generally in unconscionable ways, from Indigenous peoples. In addition, our research on environmental science and sustainability has benefited and continues to benefit from access to land originally gained through the exploitation of others. Knowing where we live and work does not change the past, but understanding and acknowledging the history, culture, and impacts of colonial practices is an important step towards the creation of an equitable and sustainable future.



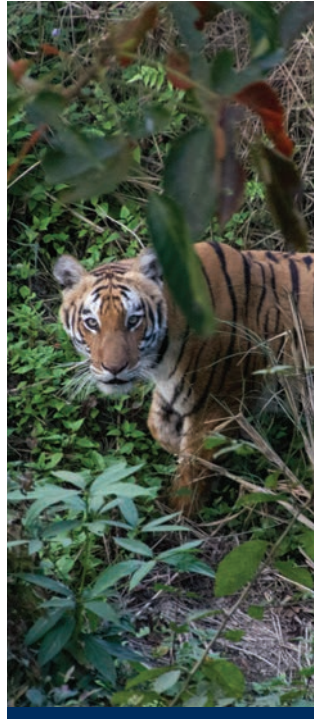
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Congratulations, Class of 2022!

Kerry Duggan (MS '06), founder and CEO of SustainabiliD and founding director of the SEAS Sustainability Clinic, delivered the keynote at the largest commencement in SEAS' history in a first-ever outdoor ceremony at Elbel Field. More than 150 graduates were recognized for excelling in areas of sustainability as part of the Excellence in Sustainability Honors Cord Program.



Photos by
Dave Brenner

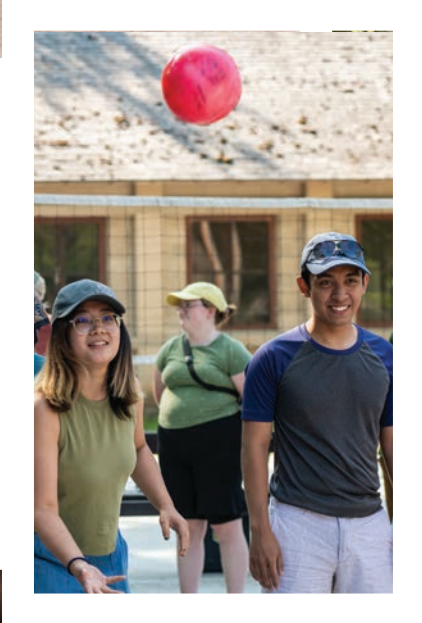


SEE MORE PHOTOS



A Return to the Bio Station

After a long pandemic hiatus, incoming SEAS students returned to the U-M Biological Station on Douglas Lake for orientation. Students collected samples of macroinvertebrates as part of fieldwork led by SEAS Lecturer Sheila Schueller, and took a guided nature walk with SEAS Associate Professor Johannes Foufopoulos, who taught them about old-growth forests, among other activities. This year's class numbers 225 master's and 16 doctoral students.





Photos by
Maddie Fox



SEE MORE PHOTOS



Freshwater is 'the Root' That Connects This Area

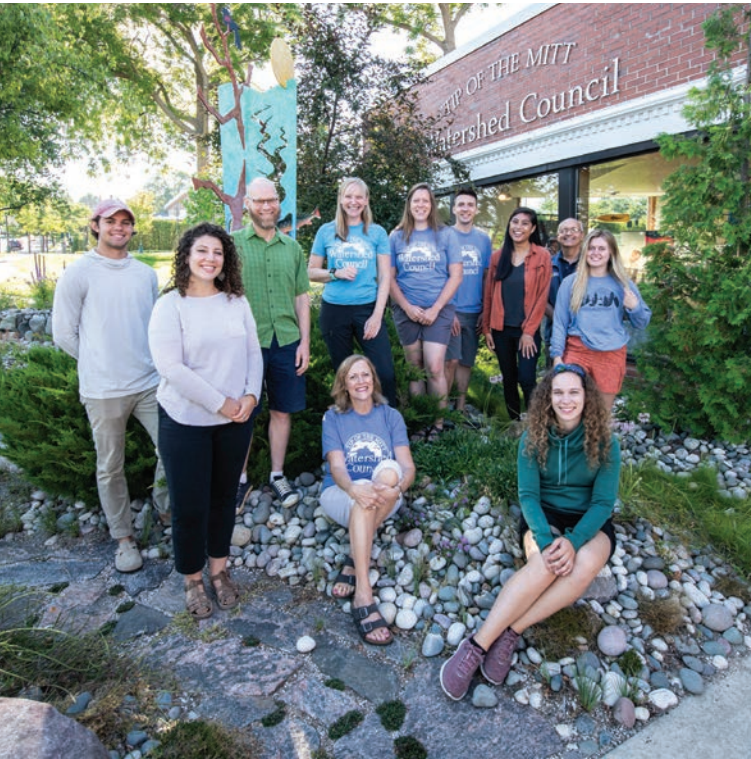
Story by
Lori Atherton

Photos by
Dave Brenner

The Obtawaing Biosphere Region is an area spanning Michigan's northern Lower Peninsula and eastern Upper Peninsula. It stretches from the Sleeping Bear Dunes National Lakeshore and across the Straits of Mackinac to Sugar Island near Sault Ste. Marie.



FROM LEFT: SEAS MASTER'S STUDENTS MIKELA DEAN, MARISA SMEDSRUD, YSABELLE YRAD AND ERIN GRAVES AT THE JORDAN RIVER, THE LARGEST TRIBUTARY OF LAKE CHARLEVOIX. THEY ARE NEAR THE JORDAN RIVER NATIONAL FISH HATCHERY.



SEAS MASTER'S STUDENTS MEET WITH STAFF FROM THE TIP OF THE MITT WATERSHED COUNCIL IN PETOSKEY.

What makes the Obtawaing Biosphere Region unique, according to Jon Allan, academic and research program officer at SEAS, is that it is made up of hundreds of protected places, from conservation lands and conservancies to state and federal forests.

And what ties these places together, says Allan, is water and hydrology.

“You can’t have healthy systems without healthy waterways,” says Allan, who is overseeing the second year of a SEAS master’s project focused on unifying the work of partner organizations to ensure the sustainability of the Obtawaing Biosphere Region. “So, the question is, how can groundwater and surface water continue to tie this region together as a unifier? Our partner organizations are interested in that question as well—and the kind of collaborative space that it provides.”

SEAS master’s students Erin Graves, Ysabelle Yrad, Mikela Dean and Marisa Smedsrud are the second cohort to work on the Obtawaing master’s project. With guidance from Allan and their other co-adviser, Paul Seelbach, Professor of Practice, the students spent last summer engaging with partner organizations, including Tip of the Mitt Watershed Council in Petoskey as well as tribes, to understand the role

of water and hydrology in their respective places and in their long-term conservation plans.

“Freshwater is really the root that connects everybody in this area,” says Smedsrud, who is specializing in Geospatial Data Sciences. “We hope that some of our deliverables will help to build that common understanding between our partners and give a communal sense of direction on how to move forward to protect it.”

The master’s students are building upon the work of SEAS graduates Daniela Fernández Méndez Jiménez (MS ’22) and Samuel La Russo Frederickson (MS ’22), who helped the partner organizations develop a shared vision, mission, and set of goals and objectives for what a sustainable future looks like for the Obtawaing region.

The bulk of the new students’ work so far has involved interviewing clients “to help determine how we can shape a sustainable future around water,” says Dean, who is studying Ecosystem Science and Management.

The interviews were accompanied by field site visits, adds Graves, “because we can’t accurately tell the story of a region without having experienced it.”

Through this “intentional exploring,” says Graves, who also is specializing in Ecosystem Science and Management, the students learned more about each area’s cultural significance and regional identity, as well as about their respective landscapes, including the plants and animals that inhabit each area.

“What was most impactful for me,” says Dean, “was getting to go out into the field with the clients and absorbing their knowledge because they were so willing to share everything they know about the landscape.”

For Yrad, who is specializing in Sustainability and Development, another highlight of the work has been the relationship-building with clients. “We aren’t just doing fieldwork or analysis,” she says. “We are actually learning what a coalition is like and how to collaborate with people in their day-to-day lives.”

This goes back to one of the main goals of the master’s project, says Allan: “It’s about helping clients organize themselves, build trust in each other and find paths forward together to create a thriving and sustainable future.” ♻️



SEAS MASTER'S STUDENTS AND PROFESSOR OF PRACTICE PAUL SEELBACH ON THE COAST OF LAKE MICHIGAN.

Protecting the Diversity of Fish in the Great Lakes

Story by
Lori Atherton

Photos by
Maddie Fox



SEAS Assistant Professor Karen Alofs has been co-teaching Biology & Ecology of Fishes to U-M undergraduate students for years. And the one thing she never tires of seeing is how excited students get when they hold a fish for the first time.

“Students are always amazed at the diversity of fish they’ll catch, even if they’ve been angling all their lives,” says Alofs. “Usually, they’re catching the same three to five species, but out here they’ll catch some beautiful fish, like the Johnny darter or the Iowa darter. It gives them a different perspective on biodiversity.”

A four-week summer course held at the U-M Biological Station, Biology & Ecology of Fishes gives students the hands-on opportunity to study fish in their natural habitats. The “classroom” includes Douglas Lake, Maple River, Carp Lake River and the nearest shore of Lake Michigan.

The nine students also head into Suttons Bay aboard a 77-foot schooner owned by the Inland Seas Educational Association, where they do offshore trawling.

“The focus of the course is for students to make observations about fish in their natural habitats so they might be able to understand something about the change in ecological or evolutionary time,” says Alofs, who co-teaches the course with Hernán López-Fernández, an associate professor in U-M’s Department of Ecology and Evolutionary Biology. Both professors also teach in U-M’s Program in the Environment.

“We teach students about why some fish species occur in certain places and not in others, and how environmental change might impact them,” Alofs adds. “We also teach them how to catch fish and collect specimens that are contributed to U-M’s Museum of Zoology for their long-term collection.”

Environmental Factors Affecting Fish

One environmental change that impacts freshwater fish is invasive species, notes Alofs, which students see first-hand in their fieldwork. Last summer in Suttons Bay, for instance, students caught hundreds of round gobies, which eat the eggs of other fish species, while in Douglas Lake, they saw plenty of zebra mussels.

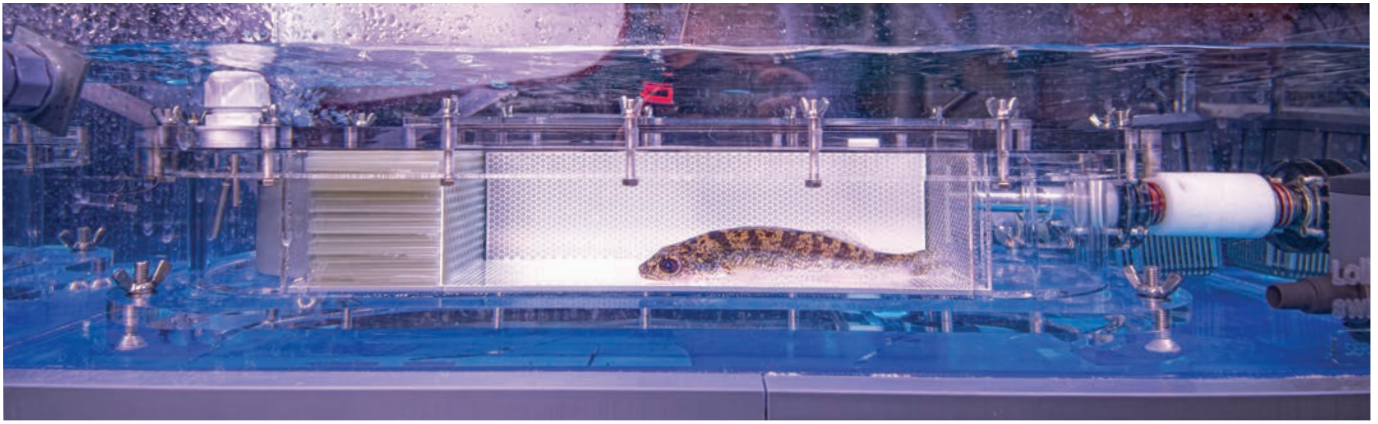
“It’s impactful for students to see,” says Alofs. “The water here is a little bit less impacted by contaminants and development because we’re up north, but those are certainly things we’re thinking about as well.”

Alofs, who runs the Freshwater Conservation Ecology Lab at SEAS, studies how environmental stressors like climate change, invasive species and habitat degradation impact fish. One of the species she studies is walleye, a cool-water adaptive species that is important for recreational and commercial fishing—and to Native Americans—in the Great Lakes.

Walleye have been declining in population due to warming water and an increase in water clarity resulting from zebra mussels, says Alofs. Working with the Michigan Department of Natural Resources, she is studying how genetics and water temperature might influence the success of fish when they’re stocked into lakes.



U-M UNDERGRADUATE STUDENTS HEAD INTO SUTTONS BAY ABOARD THE SCHOONER OWNED BY THE INLAND SEAS EDUCATIONAL ASSOCIATION.



A WALLEYE TEMPERATURE EXPERIMENT IN SEAS ASSISTANT PROFESSOR KAREN ALOFS' FRESHWATER CONSERVATION ECOLOGY LAB.

“We’ve been looking at their metabolic rate, which can be strongly influenced by temperature, and how it relates to how much food demand they have for their activities,” Alofs says. “As temperature increases, the metabolic rates change in ways that may mean walleye will have less energy for growth and reproduction and foraging.”

“

So far, more than 2,000 volunteers from around the world have helped to transcribe 100,000 historical records about lake conditions and fish differences.”

Another project Alofs is working on involves collaborating with the Institute for Fisheries Research to “crowdsource” the digitizing of historical lake data from the last 100 years. So far, more than 2,000 volunteers from around the world have helped to transcribe 100,000 historical records about lake conditions and fish differences.

Using the historical data, Alofs and her team will develop models to predict how climate change will impact fish growth and abundance in the future.

“We’re using this historical data to look at what changes have already happened with fish and see how models could have predicted those changes,” says Alofs. “We’re looking backward instead of forward to understand the impacts of climate change and other factors on these fish.” 🍀



SEAS ASSISTANT PROFESSOR KAREN ALOFS STUDIES HOW ENVIRONMENTAL STRESSORS IMPACT FISH, INCLUDING WALLEYE.



A STUDENT COUNTS THE NUMBER OF INVASIVE GOBY FISH COLLECTED IN THE TRAWL NET.

FishPass Project Draws Inspiration From Single-Stream Recycling

Story by Lori Atherton

Invasive aquatic species such as sea lamprey have been wreaking havoc on the Great Lakes for at least a century. And a challenge that fishery managers continue to struggle with is how to allow desirable fish to pass through waterways to spawn while simultaneously keeping out “bad” fish. In Traverse City, a unique approach to selective fish sorting is being developed—and its inspiration comes from single-stream recycling.

Known as FishPass, it is the capstone of a 20-year project to restore the Boardman (Ottaway) River and reconnect it to Lake Michigan, according to the FishPass website.

FishPass will replace the aging Union Street Dam with a new vertical barrier that includes a fish-sorting channel that can separate fish based on their size, shape, color, swimming ability and other factors, in a similar way that single-stream recycling facilities sort glass, paper and metal according to their attributes, says Andrew Muir, science director of the Great Lakes Fishery Commission (GLFC) and a SEAS lecturer, who is also the FishPass project director.

“There’s a mixed assemblage of materials in single-stream recycling, and those materials arrive at a facility much like a group of fishes moving into a river would arrive at a barrier,” Muir says. “Those materials get sorted based on their properties, so we wondered if we could do the same thing with fishes.”

The intended result is that desirable fish will be allowed upstream, while harmful or undesirable fish like the invasive sea lamprey will be blocked from passing through the barrier.

“Our goal is to restore ecological connectivity so that native migratory fish can reach their spawning habitats in tributaries to the lakes and continue to repopulate,” Muir says, “while preventing harmful invaders from also reaching those habitats.”

If successful, FishPass—which is the first of its kind, according to Muir, and has involved collaboration from local, tribal, federal and state agencies and other organizations—could serve as a model for other tributaries elsewhere in the Great Lakes and beyond. Construction is slated to be completed in 2024. ♻️



A RENDERING OF THE FISHPASS PROJECT, WITH THE FISH-SORTING CHANNEL MARKED ABOVE. IMAGE CREDIT: AECOM



SEAS MASTER'S STUDENTS EZEKIEL HERRERA-BEVAN AND CHANTALLE VINCENT TAKE A TREE CORE SAMPLE AT THE U-M BIOLOGICAL STATION.

Studying Trees for Clues About Climate Change

Story by Lori Atherton

Photo by Maddie Fox

Working as a research assistant for SEAS Professor Inés Ibáñez is an experience that SEAS master's student Ezekiel Herrera-Bevan will remember fondly for years to come—especially since it involved cataloging thousands of trees at the U-M Biological Station.

“There were some big trees, so it was really cool to measure them and think that they must be hundreds of years old,” Herrera-Bevan says.

Herrera-Bevan, along with his research partners—SEAS master's students Chantalle Vincent and Brian Geiringer and Eastern Michigan University student Jonas Motino—got a close-up view of different trees as part of a tree census for Ibáñez, who is a biologist. Her research focuses on the challenges that plant communities are facing because of climate change, invasive species and landscape fragmentation.

The students spent part of June and July working in research plots in four different forests at the Bio Station (pine balsam, northern hardwood, boreal and aspen) to capture important data about tree growth and the environmental conditions that may be affecting it.

They noted if trees had died, measured the diameter of trees that are still alive and recorded new trees whose growth exceeded two meters. They also collected data on soil moisture and temperature and other environmental variables.

The students' work was no small feat, given they had to catalog thousands of trees in only a month's time, Herrera-Bevan says. “We'd constantly be thinking, ‘did I get all the trees, did I miss one?’”

The data that he and the other students collected provides important clues about trees and their ability to adapt to changing temperatures, invasive species, pollution and other environmental factors, says Ibáñez, whose research extends beyond the Bio Station to Sugar Island in the St. Mary's River between Michigan and Ontario, Canada, and to Isle Royale National Park in Lake Superior.

For Herrera-Bevan, whose specialization is Ecosystem Science and Management, the experience reaffirmed his interest in becoming a conservation biologist. It also was an opportunity to study some of Northern Michigan's common trees and their ecosystems in a way he hadn't before—something the California native greatly valued.

“It was interesting to see the differences in forest composition and their environments,” Herrera-Bevan says. “In the boreal forest, for instance, it was all conifers, and the ground was swampy and mossy. But in the northern hardwood forest, where there were beech and birch trees, it was very dark because of the huge canopy of trees above us.

“I'm happy I had the opportunity to contribute,” he adds. “It's something I'm going to look back on and be extremely fond of and appreciate.” 🌿

Pairing Solar Development With Innovative Land Management

Story by
Lori Atherton

Photos by
Maddie Fox



SEAS ASSISTANT RESEARCH SCIENTIST BRENDAN O'NEILL LOOKS OVER POLLINATOR PLANTS AT THE CADILLAC SOLAR GARDENS.

With solar energy in Michigan poised to grow exponentially in the next decade, SEAS Assistant Research Scientist Brendan O’Neill says the time is right for solar developers to find innovative uses for their land that will optimize sustainability.

“Renewable energy is great, but it can count double if we manage it properly,” says O’Neill, who, for the past two summers, has been researching soil health and pollinator habitats at Cadillac Solar Gardens, a former brownfield site that was redeveloped through the collaborative efforts of the City of Cadillac, the State of Michigan and Consumers Energy, which owns the site.

“Right now, solar developers evaluate where they’re going to put sites based on their proximity to connecting to the power grid or the flatness of the topography,” O’Neill notes. “Really, though, solar development should be aligned so that it optimizes both energy and ecosystems—whether it’s biological diversity, the capacity to grow crops or the ability to improve water quality or sequester soil carbon.”

It’s a novel approach to land use and solar development, says O’Neill, who, in partnership with Consumers Energy, is using the solar gardens as a test site to study the soil ecological processes that lead to sustainable and regenerative land use. O’Neill is comparing three different plant communities—a standard turf grass mix and two diverse pollinator mixes—underneath and between the solar panels, and has been monitoring them over the past year to determine if pollinator-friendly plants can sequester carbon and regenerate degraded soil.

O’Neill’s research thus far has yielded two key findings. One is that plant biomass productivity of the pollinator mixes is double that of the grass mix. Plant biomass is the leading indicator of how much carbon you can sequester, “so the more biomass you have, the more carbon you can build in the soil,” O’Neill explains. Instead of regular mowing which releases CO₂, the pollinator plant communities draw in atmospheric carbon and store it in soil.

“This reflects the fact that if you are a bit more innovative with what you plant, you not only have more aesthetic beauty with pollinators, but you can also build carbon much more rapidly.”

Another important finding relates to the effects of growing plants in shaded areas versus non-shaded areas. While it may appear that plants underneath solar panels might not grow as well as plants that are in the open “alleyways” between the panels, O’Neill says he “hasn’t found a strong difference” in plant productivity between the two areas.



BLACK-EYED SUSANS AT THE CADILLAC SOLAR GARDENS.

In fact, the cooler, wetter microclimate underneath solar panels actually benefits certain types of plants, O’Neill adds, which means there is the potential for solar sites to favor a variety of diverse plant species that can enhance ecosystem services on the solar site.

“What this research really highlights is that if you develop solar creatively, you can really ensure that this large land-use transformation is built for sustainability,” notes O’Neill. “And it provides a toolbox to develop solar in a way that’s compatible with different land uses, from agriculture to conservation.”

Over the next year, O’Neill will continue to measure how pollinator mixes build soil health and quantify changes in soil carbon on the solar site. Ultimately, he wants to use the data to develop a model for how to optimize ecosystem services on other solar sites across Michigan, which SEAS second-year master’s student Haley Dalian fully supports.

“It is no longer enough to install solar panels without considering the soil, vegetation and organisms residing beneath them,” says Dalian, who assisted O’Neill’s research efforts last summer while interning for Consumers Energy. “Dr. O’Neill’s experiments on soil health and pollinator habitat at the Cadillac site are critical to informing utility-scale solar land management going forward for mutual benefit.”



SEAS SECOND-YEAR MASTER’S STUDENT HALEY DALIAN.

The Forever Business: Conservation Leader Glen Chown

Story by
Denise Spranger

Photos by
Maddie Fox

I turned 60 last year, and sometimes I'm asked, 'Glen, are you tired of this? Do you ever get bored?' I tell them I've never been more fired up, and that I'm not going anywhere. We've got to finish what we started."

Glen Chown (BS '83, MS '86), executive director of the Grand Traverse Regional Land Conservancy (GTRLC), has good reason to be "fired up," and the countless Michiganders who have benefited from his advocacy throughout the decades are glad to hear that he'll be sticking around.

Chown traces the beginning of his career to a paid internship he was awarded while completing his master's degree. In the mid-1980s, The Nature Conservancy (TNC) Michigan chapter had a staff of only four, and Chown became its first intern.

"SEAS gave me my launchpad," says Chown.

That launch propelled him to the TNC Virginia chapter, and then on to Michigan's Little Traverse Conservancy in 1988. Before long, Chown was approached by Rotary Charities, a nonprofit public foundation interested in establishing a conservancy to protect the Grand Traverse region from rapid overdevelopment. In 1991, GTRLC was incorporated—with Chown at the helm.

Asked what he is most proud of in his career, Chown doesn't hesitate. "It's the impact we've made," says Chown. "We have 46,000 acres and nearly 150 miles of undeveloped shoreline protected in what is arguably one of the most beautiful places on the planet.

"I tell people I'm in the 'forever business,'" he adds. "It's not just for now, it's forever. And that's an incredible legacy."

Arcadia Dunes

An achievement close to Chown's own heart is the Coastal Campaign, launched in 2003—a multi-year effort to protect 6,300 acres of premium dune, farm and forest land along 3.5 miles of Michigan's coast. The property owner, CMS Energy, was seeking private developers to purchase the tract.

"It was a David and Goliath story," says Chown. "We were a small nonprofit with a staff of eight, and suddenly we needed to raise over \$35 million in an incredibly short period of time. It was audacious. But we decided to give it our best effort, and leave no stone unturned."

The first milestone—a \$7.5 million challenge grant issued by the Mott Foundation—stipulated that GTRLC raise \$5 million from local people in the 90 days between Memorial Day and Labor Day.

"Our third child had just been born, but my family rarely saw me that summer," recalls Chown. "I was talking to people 24/7 about what was at stake. Amazingly, the entire community wrapped their arms around us. There were 18-year-old waitresses saving money for college at the Watervale Inn who contributed 50% of their tips. That's one example of people making a heroic effort. We pulled it off. We realized that if you dream big, you can do big things."



Campaign for Generations

In recent years, the Campaign for Generations protected more than 7,500 acres across five counties and 26 miles of undeveloped shoreline on rivers, lakes and streams. Nearly 90 projects were completed, including more than 20 new nature preserves, parks and natural areas. It also doubled its trail system, including universally accessible trails that people of all ages and abilities can enjoy.

“Ensuring that people have lifelong access to these beautiful places was the spiritual core of the campaign,” says Chown. “In the old days, we were protecting land from developers and from people. Our organization evolved to protect land for people.”

That message, says Chown, resonated deeply across communities. The campaign goal of \$71.4 million was exceeded—reaching a total of over \$94 million from approximately 6,000 donors.

Fired up for the Future

GTRLC’s ongoing project, Mitchell Creek Meadows: The Don and Jerry Oleson Nature Preserve, is a former 225-acre golf course near Traverse City’s urban core—and lies in a watershed critically important for safeguarding water quality in East Grand Traverse Bay. Plans include wildlife habitat restoration, nature trails and an existing building refitted to become the Conservation Center, GTRLC’s new headquarters.

“We hope to welcome a dozen or more interns to the center who are interested in careers in conservation,” says Chown. “That’s one of our long-term goals at GTRLC—to help nurture the next generation of conservation leaders—and something that my alma mater and this organization could work on together.

“When I was at SEAS nearly 40 years ago, I was given a chance. And now I’d like to give that chance to the ones next in line.”



GLEN CHOWN AT THE MAPLE BAY NATURAL AREA ALONG LAKE MICHIGAN.
PAGE TOP: BALDY DUNE, PART OF ARCADIA DUNES: THE C.S. MOTT NATURE PRESERVE.

Leaving its
Mark on
the Local
Economy and
Michigan's
Waters

Carlson's

Story by
Kim North Shine

Photos by
Eric Bronson



ABOVE: THOUSANDS OF POUNDS OF FISH MOVE ACROSS STORE COUNTERS EACH WEEK. LEFT: NELS CARLSON, THE FIFTH-GENERATION OWNER OF CARLSON'S FISHERY.



FISHING AND PLEASURE BOATING ARE BOTH POPULAR ON LAKE MICHIGAN.

As an undergraduate student doing research at the U-M Biological Station, Nels Carlson (MS '05) was fascinated by what he saw and learned from the aquatic invertebrates he caught, in the water samples he collected and the data he analyzed.

The waters and what lives in them, especially the fish, were something Carlson studied informally his whole life. It's a given when the generations-old family business is Carlson's Fishery, a popular tourist draw in historic Fishtown on the Leland River.

Today, the SEAS graduate is using lessons from his student research days to add to and enhance the work he does as the fifth-generation owner of the fishery—a cog in the community, a contributor to the local and state economies and a player in historic, maritime preservation in Northern Michigan.

Fishery

Carlson's is also a critical source of information for the state of Michigan, U-M and other universities and researchers working to protect and improve the health of Michigan's waters and fish populations.

"Everything I learned at U-M has played a role in what I currently do," Carlson says. "I draw on it so frequently it's become second nature to me. Many things we learn, we forget. But when you put what you've learned into practice in your daily life, it becomes something you draw on without even realizing it."

It was his studies as a curious college student who loved the water and Northern Michigan that "gave me a great deal of insight as to how the inland lakes and Great Lakes ecosystems work and their importance in shaping our current way of life, particularly how my family emigrated to the area and sustained

our way of life since the 1800s," he says. "In one way or another, my family has been closely tied to the ecosystem, biology and ecology of the area and its health."

What the fishery's visitors—locals, annual summer tourists and occasional one-time customers—find at the quaint 129-year-old business goes beyond the popular whitefish pate, the weathered smokehouses and the thousands of pounds of fish moving across store counters each week.

Behind the scenes, the fishery with its shop, dock and grounds seemingly unchanged since the 1800s, acts as a harbinger of the health of Michigan's waters and inhabitants. Being a source of information on water quality and invasive species is a ripple effect of an operation that relies on the lakes.

Carlson's is regularly called on by Michigan Sea Grant, the Michigan Department of Natural Resources, local conservation officers and various researchers to collect or share information. Often, the fishery saves any lamprey it brings in. Lamprey is an invasive species that damages lakes and native marine life. The lamprey is used to glean information that might lead to solutions to control invasive species.

"Being involved in research and field studies gives you a huge leg up in understanding how the state and other organizations sample, collect and analyze data. It also gives you a sense of what to pay attention to when observing the fish populations as well as the general ecology of the lake," Carlson says.

Carlson and a business partner bought the fishery from his uncle in 2012 in an effort to save it and keep the business in the family. He's working hard to keep it thriving for the next generation as he also updates it to fit today's needs.

"Fishtown and the fishery have always felt like home to me," Carlson says. "Continuing a tradition and a sense of community and heritage, that makes me very proud." ♡

This article originally appeared on the U-M Impact website. It is reprinted with permission.



Fostering Human-Tiger Coexistence in Nepal

Story by
Lori Atherton

Photos by
Amy Zuckerwise

A TIGER ON THE PROWL IN BARDIA NATIONAL PARK IN NEPAL. TIGER POPULATIONS HAVE ALMOST TRIPLED ACROSS THE TERAI ARC LANDSCAPE IN NEPAL SINCE 2009.

SEAS PhD student and wildlife researcher Amy Zuckerwise has studied ocelots in Bolivia and bobcats in California. But even she was amazed at how thrilling it was to see Bengal tigers up close in the wild when she visited Nepal last spring.

“When you see a tiger, everything immediately stops, and everything becomes hushed,” Zuckerwise says. “I got lucky and saw three tigers, when many people never get a chance to see even one, so it was pretty incredible.”

These majestic creatures were the reason Zuckerwise traveled more than 7,400 miles to the Terai Arc Landscape, an area in southern Nepal filled with forests, grasslands, rivers and agricultural lands that are shared by more than 13 million people and home to endangered species, including greater one-horned rhinos, Asian elephants and Bengal tigers. Taken during the Year of the Tiger, it was the first of several research trips Zuckerwise plans to take in support of her dissertation, which focuses on the impacts of road development on tiger populations.

Tracking Tigers

Zuckerwise is building on the research that her adviser, SEAS Associate Professor Neil Carter, began two years ago when he visited the Terai to partner with the Nepal Department of National Parks and Wildlife Conservation, the National Trust for Nature Conservation and the International Union for the Conservation of Nature in Nepal to place GPS collars on tigers living near roads.

Nepal, one of the least-developed nations in the world, is undergoing rapid road and infrastructure development aimed at connecting remote villages and fostering economic growth. Zuckerwise says there is concern about how this transportation development may affect tigers, whose numbers have almost tripled to 355 since 2009 thanks to conservation efforts.

The collars, while inconspicuous to the animals so as not to impact their behavior, connect to GPS satellites at least 16 times a day, and can capture real-time data about tiger movement, such as how tigers move along roads before and



SEAS' AMY ZUCKERWISE AND NEIL CARTER WITH KRISHNA HENGAJU OF THE NEPAL OFFICE OF THE INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE.



AMY ZUCKERWISE AND KRISHNA HENGAJU USE GPS TRACKING TECHNOLOGY TO MONITOR TIGER MOVEMENT IN THEIR NATURAL HABITAT.

after crossing; where and how they hunt near roads; and how they respond to vehicle traffic.

“The GPS collars can give us detailed information about tigers that we can’t get any other way,” Zuckerwise says. “Combining that technology with the perspectives of Nepali people who live with tigers in their landscape will give us new insights about how to balance the needs of people and economic development with ongoing wildlife conservation efforts.”

“

When you see a tiger, everything immediately stops, and everything becomes hushed.”

Zuckerwise had hoped that a collar could be placed on at least one tiger during her visit, but none ventured close enough to the survey area. She and her team also wanted to retrieve a collar that had dropped off a previously collared tiger, but they were not able to find it.

“That’s the nature of fieldwork,” Zuckerwise says, noting that the trip was beneficial in other ways. Not only was it “amazing” to see “big and healthy” tigers thriving in their natural habitat, but the trip also enabled Zuckerwise to learn more about the history of Nepal and the cultural significance of tigers, as well as meet her Nepali colleagues in person after spending the past year connecting with them via Zoom. “It was really important for me to show up for our Nepali collaborators and put into action the research that I’m doing,” Zuckerwise notes. “The point of doing a conservation project in their country is to partner with them to develop solutions that will help them better coexist with tigers.”

A Passion for Feline Conservation

Zuckerwise, who was born and raised in Los Angeles, has had a lifelong love of cats, both domestic and wild. After earning her undergraduate degree from Stanford University, where she studied bobcats, she completed a master’s degree at the Yale School of the Environment, which led to ocelot research in the Amazon rainforest of Bolivia.

When Zuckerwise, who was working as an environmental scientist for the California Department of Fish and Wildlife Bobcat Program, learned about the opportunity to study tigers with Carter, she says she jumped at the chance to apply, as she knew it was the “perfect project” for her to continue her passion for feline conservation.

While preparing for a second trip to Nepal this winter, Zuckerwise has been analyzing preliminary data taken from the two tigers that were collared during Carter’s original trip in 2021. The information suggests that the tigers, who are located near the East-West Highway, are influenced by how much traffic is on the road, Zuckerwise says. The tigers seem to avoid crossing the road in high-traffic areas but cross the road more frequently in low-traffic areas.

This information, Zuckerwise notes, can help inform ways to make roads more tiger-friendly, such as by implementing speed limits or wildlife crossing signs or realigning roads away from tiger habitats. ♡



Developing Water Policy Solutions that Ensure a Just and Resilient Future

Story by **Nayiri Mullinix** Photos by **Dave Brenner**

Water is one of Earth's most precious resources, and although it's abundant, water quality and access are not always equitably distributed. The impacts of decisions made about water resources and infrastructure are far-reaching, affecting not only the daily lives and health of all people but also broader patterns of environmental and climate change. How can we best support water and climate policy solutions that ensure a just, sustainable and resilient future? This is the focus of Sara Hughes' work.

"Our complex infrastructure systems, like drinking water and stormwater infrastructure, are very much related and jointly underpin sustainable and resilient cities," says Hughes, a SEAS associate professor and leader of the Water and Climate Policy Lab. "My research is focused on two specific water policy issues that are important for the Great Lakes region: stormwater flooding in our cities and coasts, and drinking water access and affordability. The ultimate goal for these projects is to generate insights that can inform decision-making at the local, state and national levels."



HUGHES



WANG

Stormwater and Flood Management

Hughes' team recently completed a project with Great Lakes Integrated Sciences and Assessments, which evaluated current state policies in the Great Lakes region to determine how well they are supporting flood management and planning by local governments. The study evaluated innovative actions that would enable local flood resilience in four policy areas: funding and financing, information provision, regulations and standards, and planning guidance. It also identified evidence of states prioritizing social equity within policies and programs.

The study's findings showed that some states are leaders in this area, while others have further to go. Michigan landed in the middle of the pack but didn't exhibit much evidence of prioritizing social equity, which Hughes says is essential. In another project, funded by the Graham Sustainability Institute, Hughes' team built a practical resource toolkit to help city officials center their decisions on racial justice.



THE ROUGE RIVER IN DETROIT, WHERE AN INTERDISCIPLINARY STUDY WILL UTILIZE WATERSHED DATA TO UNDERSTAND HOW URBAN FORM AND LOCAL POLICIES CONTRIBUTE TO URBAN WATER QUALITY.

Collaborating with Landscape Architects to Inform Stormwater Policy

Alongside SEAS Assistant Professor of Landscape Architecture Runzi Wang, Hughes has launched an interdisciplinary study of Detroit's Rouge River that will utilize watershed water quality data from the Michigan Environmental Protection Agency and the U.S. Geological Survey to help understand how urban form (the physical characteristics that make up built-up areas) and local policies contribute to urban water quality. According to Wang, the integration of landscape architecture expertise in this type of study is a novel approach. "I believe this is the first trial to link upstream policy and other top-level factors all the way downstream to the environmental outcomes. We'll try to understand what happens in between," she says. "Urban form is a very important mediating factor, and we're looking at the big picture by combining policy, landscape architecture, urban planning and water quality."

Will Sollish, who is pursuing a master's in Environmental Policy and Planning, and Erin Posas, who is pursuing a master's in Environmental Justice, are assisting with the project. Sollish notes that the project is helping them understand how urban form, residential decision-making and policy come together to affect urban water quality, while Posas says it offers an opportunity to understand how policy works in practice. "Focusing on the Rouge River grounds our work locally, enabling us to support the community we live and work in," she says. "As a student, I see this as an exciting opportunity to build on years of research and continue the work of peers who have worked to protect water quality before us."

Drinking Water Risk and Resilience

As for drinking water, Hughes says that cities across the nation are facing immense fiscal stress that has been brought on by the confluence of increased demands for critical city services and declines in revenues needed to support those increased demands. Financial stress can present a significant risk to the resilience of services that people depend upon, which is why she, along with four SEAS and two U-M Taubman College of Architecture and Urban Planning students, is working to generate a new, publicly accessible database for scholars and policymakers. Building on this National Science Foundation-funded national study, Hughes is part of a three-university team that has a contract with the state of Michigan to explore how regionalizing drinking water management and infrastructure might help financially strapped cities make their resources stretch further.

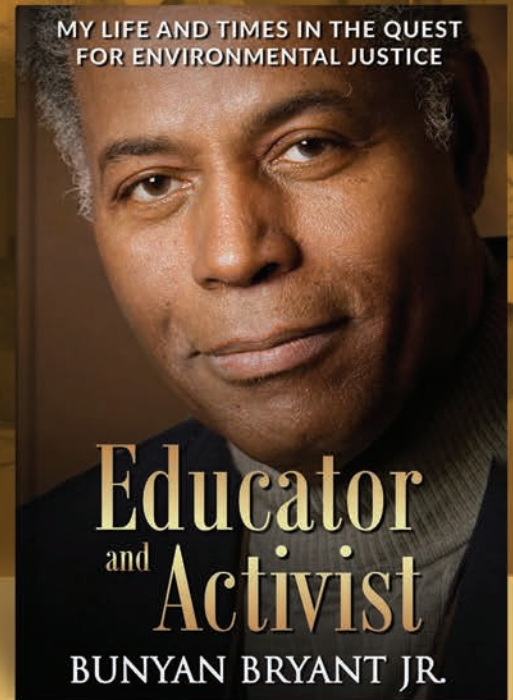
The project team has compiled and matched details about the drinking water systems of more than 2,000 cities nationwide to develop the Municipal Drinking Water Database, which integrates information about drinking water systems and cities including local government spending and revenue, election outcomes, demographics, institutional contexts and drinking water system conditions and characteristics.

"This new database will be a fantastic resource for both scholars and decision-makers who are interested in better understanding broad trends in drinking water spending and investment, and more specific hypothesis testing around why some cities are struggling to maintain reliable services and others are not," says Hughes. "We are excited to make this information public and see how the community will use it." 🍃

Nurturing Environmental Justice Activists

By Bunyan Bryant Jr.

An excerpt from “Educator and Activist: My Life and Times in the Quest for Environmental Justice,” by Bunyan Bryant Jr., professor emeritus at SEAS and a pioneer in the environmental justice movement. His memoir was published in April 2022.



Over time, our program’s focus on environmental advocacy became part of the broader emerging field known as environmental justice.

I first heard the term in 1976 at Working for Environmental and Economic Justice and Jobs, a conference sponsored by the United Auto Workers (UAW) at Black Lake near Onaway, Michigan. Two former students of the U-M Environment Advocacy Program, Margaret Allen and Phil Perkins, a husband-wife team working for UAW, played a major role in organizing it. This conference brought together over 350 people from diverse groups, such as labor unions, environmental and civil rights organizations, and community groups, as well as farmers, Native Americans, Blacks, and whites, to discuss environmental and economic justice and jobs. This conference had a profound effect upon me, and ultimately on my teaching. The participants were locked up together for three days, trying to understand one another. The debate was intense. “Until you talk about my having food, shelter, and clothes, I’m not listening to any appeals from environmentalists,” a Black woman from Detroit shouted out in a workshop. She spoke for many people at the conference. Labor members thought that environmental regulations caused companies to close shop and move to places with fewer regulations, leaving people

jobless and eroding the tax base essential for city services.

Environmentalists brought a different perspective to the conflict. When pollution and toxic waste go unchecked, they poison our communities and cause sickness and even death. What good is it to have a decent-paying job if one becomes too ill to enjoy life? Environmentalists argued that it was not an either/or choice; workers could have both good jobs and a clean environment in which to work and live.

The term environmental blackmail was intensely debated at the conference, referring to when workers are forced to choose between hazardous work and environmental protection. Plant managers, for example, will threaten workers with loss of jobs if the company must adhere to stricter environmental regulations. The purpose of environmental blackmail is to get workers to side with the company to protect their jobs, rather than siding with government-sponsored environmental regulations to protect their health. Everyone could agree that environmental blackmail was despicable—but finding a way to escape it that everyone could accept was much more difficult.

The conference resulted in a greater appreciation for and understanding of diverse views and the need for all groups to work cooperatively for both environmental quality

and economic justice. But the UAW dropped the ball. The union's leaders failed to see that environmental justice and environmental protection would mean, in the long run, more jobs and cleaner jobs.

However, the Black Lake conference did have at least one lasting impact. By the early 1990s, when I revisited newspaper accounts of the Black Lake conference, I realized that the words "environmental justice" had now attained greater acceptance in academe and among potential funders than "environment advocacy." Today, "environmental justice" has become a widely used term with a variety of definitions.

In the 1970s and 1980s, students from the Environmental Advocacy Program became increasingly involved in working to support the concept of environmental justice. Their work took a number of forms.

Many of our students joined forces with labor unions to increase their awareness of environmental issues and safety in the workplace. They organized communities to fight against tax increases to finance the construction, repair, or clean-up of nuclear power plants. They fought to close nuclear power plants because they were unsafe and the energy companies that owned them had failed to dispose of nuclear waste properly. They worked to reverse the tide of plant closings leaving cities with an eroded tax base. They worked for adequate fire, police, and social-service protections as companies moved to distant shores for cheaper labor, resources, and less stringent environmental regulations, turning U.S. cities into wastelands and breeding grounds for crime and delinquency. They worked with communities to close incinerators and advocated for reduction of waste streams through recycling as an alternative to a heavy reliance upon landfills. They worked with numerous communities to improve their existing housing stock and to build affordable housing for low-income people. Across the nation, they worked in such organizations as Oregon Fair Share, Ohio Public Interest Campaign, Connecticut Citizen Action Group, Association for Community Organizations for Reform Now (ACORN), the Citizens Energy Coalition, and in various city planning and government agencies.

As you can see from this list, the students my colleagues and I trained have been a powerful force for positive change across the United States. I'm very proud to have played a role in inspiring these idealistic and energetic young people to serve our nation in this way. 🍀

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EJ PROGRAM GROWS

SEAS is growing its Environmental Justice (EJ) program with the addition of new hires whose real-world expertise will give students the opportunity to learn from leaders with a track record of making genuine change. SEAS welcomes the following EJ experts to the program:

Michelle Martinez (MS '08), the inaugural director of the Tishman Center for Social Justice and the Environment and a SEAS lecturer. Martinez, who studied under Professor Bunyan Bryant, will continue to build on Bryant's legacy of activism and involvement in grassroots movements.

Justin Schott (MS '06), a SEAS lecturer who is teaching an energy equity course this fall in addition to continuing his role as project manager of SEAS' Energy Equity Project. He previously worked at EcoWorks, a Detroit nonprofit focused on sustainability and community development.

Cedric Taylor who, after a successful year of teaching an environmental justice course about Flint, will remain with SEAS through 2023 as a visiting associate professor. He is teaching *What Happened in Flint: The Causes and Consequences of the Water Crisis* and *Documentary Filmmaking for Activism: Benton Harbor*.

shakara tyler, a SEAS lecturer who is teaching an environmental justice course this fall. She works with Black farming communities in Michigan and the Mid-Atlantic, with a focus on sustainable food systems.

Summer Discussion Series

We asked alumni and students about their favorite books, memorable SEAS experiences and how they promote sustainability. Log on to SEASnet, the SEAS online community network, for more insights. Not a member of SEASnet? Join now at myumi.ch/kybpV.

What are your recent reads that you would recommend?

“Born a Crime” by Trevor Noah

—Analise Sala (MS '22)

“Dune” by Frank Herbert

—Patrick Lewis (BS '19)

“On Earth We’re Briefly Gorgeous” by Ocean Vuong

—Alicia Kawamoto (MS '23)

“Braiding Sweetgrass” by Robin Wall Kimmerer

—Robert Sanford (BS '77)

“The Avant-Guards” by Carly Usdin and Noah Hayes

—Kate Hutchens (MS '21)

“Lilith’s Brood” by Octavia E. Butler

—Todd Ziegler (MS '15)

“The Night Portrait: A Novel of World War II and da Vinci’s Italy” by Laura Morelli

—Kathryn Bomey (MS '12)

“Y: The Last Man” by Brian K. Vaughan and Pia Guerra

—Brianna Knoppow (BS '05, MS '13)



MIRANDA DUPRE AND HER MASTER'S PROJECT TEAM CELEBRATE GRADUATION DAY LAST APRIL (FROM LEFT): MAISY ROHRER, ANNA CONE, DUPRE, ALLISON WILLIAMS AND TOYOSI DICKSON.

“My favorite memories surrounded my master’s project and the Dana Building—meeting my teammates in person for the first time in the fourth-floor conference room, spending whole weekends in empty classrooms working on our presentation, then finally presenting and taking a celebratory selfie in front of the building to capture what felt like the ending of an era.”

—Miranda Dupre (MS '22)

How do you incorporate sustainability into your daily life?

“I volunteer with Citizens’ Climate Lobby to advocate for meaningful action on climate change. They are well-organized and offer great resources to their volunteers, both online and from real people.”

—Victoria McMillan (MS '03)

What was your favorite SEAS experience, memory or class?

“A summer at Camp Filibert Roth! Excellent instructors, wonderful classmates, beautiful environment, competition with other forestry programs—well, everything except for mosquitoes and black flies and no-see-ums!”

—Leonard Malczynski (BSF '75)



NIVEDITA BISWAL (MS '24)
MUNNAR, KERALA, INDIA



COLM FAY (MS/MBA '12)
CLEW BAY, COUNTY MAYO, IRELAND



HEATHER NEWBERRY (MS '22)
ODEN ISLAND, MICHIGAN



DAMON KRUEGER (PHD '10)
VICTORIA, AUSTRALIA



JESSICA LEE (BS '19)
FLORENCE, ITALY

SEAS Travel Photo Contest

Nearly 50 photos from places near and far were submitted by the SEAS community in the annual travel photo contest on SEASnet. View more at myumi.ch/kybpV.

First-Place Winner

Sara Srinivasan (MS '14)

Wind turbines in the hills of the holy city of Tirumala, India, with a wooden figure of Vishnu, one of the principal deities of Hinduism, in the foreground.



Second-Place Winner

Leonard Ang (AB '16)

Hutt Lagoon, a marine salt lake in Western Australia.



Third-Place Winner

Kia Billings (BS '19, MS '21)

A mountain lake at 5,000 meters in Peru.



Q&A



10 Questions: Associate Professor Bilal Butt

Bilal Butt's research aims to answer questions about how people and wildlife are adapting to changing climates, politics, livelihoods and ecologies in sub-Saharan Africa.

Why Africa?

I was born and raised in Kenya. I went on my first “safari” at 6 months old, so you could say it’s a hugely important part of who I am, and what I continue to do. As I grew up and traveled to national parks with my family, I began to realize there was a deep conflict between humans and wildlife. I wanted to understand this conflict better. With my research, I bring a political, spatial and historical context to better understand these complex issues.

You describe yourself as an Africanist, geographer and political ecologist. How do these titles work together?

As an Africanist, geographer and political ecologist, I try to weave different narratives together. I utilize cutting-edge research to tell a more accurate story to inform conservation and development efforts and alleviate human-wildlife conflict. For example, a big issue in Zambia’s Kafue National Park right now is with elephants. From the human side, the concern is about human safety and crop destruction. From the conservation side, it’s about poaching and the sale of ivory. Both stories are important, but it’s important to adequately contextualize them.

Tell us about an application of technology in your work.

In one project, we wanted to better understand pastoralists’ livestock grazing in national parks—their movements and patterns within and around protected areas. There was concern that livestock grazing had a negative impact on these lands.

We attached GPS to cattle and collected a data point on them every 10 seconds, following them over an extended period. We tracked them over wet, dry and drought seasons. What we found is interesting; the herders were conscious about the grazing locations, utilizing different parts of the landscape at different time periods. These findings demonstrated the remarkable resiliency within the pastoral livelihood system in adapting to changing environmental conditions.

What is the most adventurous thing you've ever done?

My early interests were the equatorial alpine mountains. I’ve gone on multiple long expeditions to these places, which are truly incredible. Gigantic flowers (Lobelias), glaciers, deep valleys and an occasional chase by wildlife... what could be better?

What is your favorite SEAS moment?

The first day of class—easily. It’s such a magical moment. Everyone comes to class slightly confused about what it is about, and they’re not exactly sure what to make of it. I love teaching students to think critically—it’s a skill that no one can take away from you. Once you have it, it stays with you forever.

What is the best advice someone gave you?

“Go slowly,” which basically means to take your time to understand.

Who is your biggest hero?

I don’t have any heroes. There are several people whose work, I think, has been admirable: Richard Holbrooke, Roméo Dallaire and Sérgio Vieira de Mello to name a few.

What is the most-used app on your phone?

BBC News.

What is your favorite outdoor activity?

Hiking. And doing research in the field. My personal and work life are very much intertwined.

Describe your first job.

Your job when you’re a kid is to be a kid—to explore! My dad helped fuel my passion for the pursuit of discovery.

SEAS Releases First National Framework Designed to Measure and Advance Energy Equity

To bolster a just transition to cleaner, more resilient energy systems, the Energy Equity Project (EEP)—housed at SEAS—released the first standardized national framework for comprehensively measuring and advancing energy equity.

“For decades, Black, Indigenous, and People of Color (BIPOC), frontline and low-income communities have borne the brunt of the negative impacts of the energy system while receiving a negligible slice of benefits from the clean energy transition,” says EEP Project Manager Justin Schott (MS ’06). “With the EEP Framework, we are both illuminating these inequities and establishing a process for reversing them. We can hope for the day when energy equity is the norm, but until then, the Framework is a powerful tool for accountability and ensuring measurable progress.”

The Framework—which builds on the longtime contributions of energy justice leaders and frontline communities—was launched by SEAS Associate Professor Tony Reames, now serving as deputy director for energy justice at the U.S. Department of Energy while on leave from U-M. EEP’s development is the result of 15 months of collaboration, including 10 listening sessions with over 400 participants representing utilities, regulators, nonprofit and academic practitioners, community organizations and philanthropists. Forty-five workgroup members—leaders in energy equity from around the country—developed guiding principles, and determined how to represent equity through metrics, data and best practices.

The release of the Framework comes at a critical time, as energy justice is now a requirement for acceptance of federal funds, most notably the infrastructure bill. The Biden administration’s Justice40 Initiative pledges to deliver 40 percent of climate investment benefits, including clean energy and energy efficiency, to disadvantaged communities. Yet efforts to define and identify both benefits and disadvantaged

communities have primarily relied on demographic data—leaving significant gaps in recognizing energy affordability and climate resilience.

The Framework was designed to remedy those gaps, ensuring BIPOC, frontline and low-income communities receive

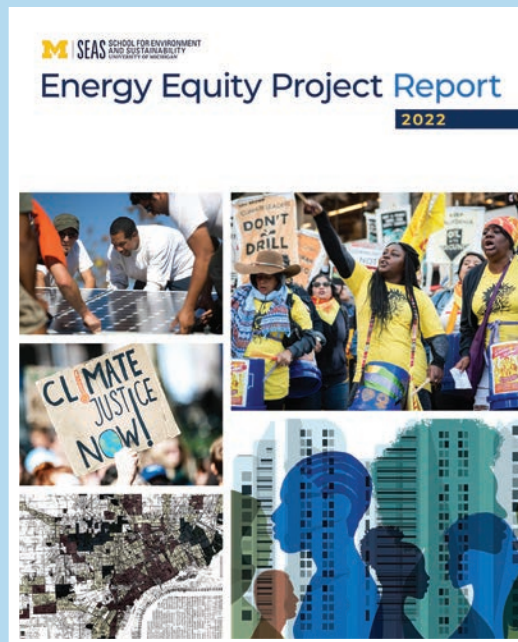
the benefits they deserve—and is primed for immediate adoption by government agencies, community organizations, regulators and utilities.

“The project’s commitment to genuine democratic collaboration has fostered transformational results that will change the lives of communities who have suffered from high energy costs, pollution and few opportunities for renewable energy,” says Kyle Whyte, the George Willis Pack Professor at SEAS, who currently serves on the White House Environmental Justice Advisory Council and is the principal investigator of EEP.

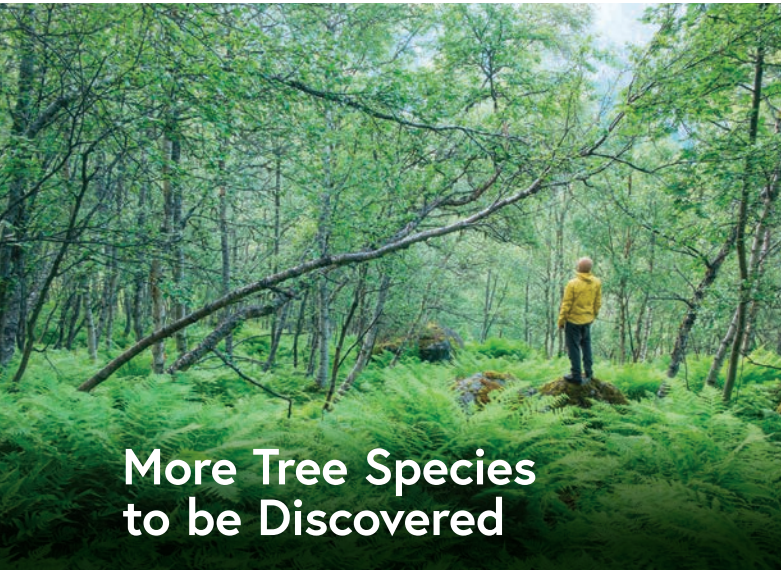
This year, EEP will release an interactive national map of energy equity data accessible to the general public. Users will be able to identify census tracts of concern, such as those who are at high risk from heat waves and have a high population of seniors who live alone.

EEP also will issue a call for partners who see opportunities to use the EEP Framework to further their local energy equity priorities. These could range from developing local energy equity indicators to making public engagement processes more accessible and transparent. EEP will prioritize applications from BIPOC and frontline community organizations. For all other potential users of the framework, EEP will offer a free series of trainings on how to apply the framework. EEP was funded by the Energy Foundation, the Joyce Foundation and Crown Family Philanthropies.

—Denise Spranger



Research Highlights



More Tree Species to be Discovered

A study involving more than 100 scientists from across the globe and the largest forest database yet assembled estimates that there are about 73,000 tree species on Earth, including thousands more yet to be discovered. **Peter Reich**, director of the Institute for Global Change Biology at SEAS, is one of two senior authors of the study.

Fish Smoking and Health Burdens

Millions of workers in coastal Africa—most of them women—spend their days preserving fish by smoking them in rudimentary, wood-fired mud ovens. Senior study author **Pamela Jagger** looked at the air pollutant exposures and health symptoms experienced by fish smokers in Ghana. She found that exposure to carbon monoxide and particulate matter (specifically, small airborne particles called PM2.5 that include soot, smoke and dust) was 2.6 times greater among fish smokers than in the control group. All PM2.5 exposures exceeded World Health Organization safety guidelines.

Automation and Long-Haul Trucking

How might automation replace operator hours in long-haul trucking? **Parth Vaishnav**, who co-authored the study, found that up to 94% of operator hours may be impacted if automated trucking technology improves to operate in all weather conditions across the continental United States.



Urban Agriculture in Detroit

Despite the abundance of vacant land and Detroit's image in the media as a hub of urban agriculture, there's a relatively low level of private and community gardens in the Lower Eastside, occupying less than 1% of vacant land, according to the study's lead author **Josh Newell**.

Renewable Energy Jobs

Across the United States, local wind and solar jobs can fully replace the coal-plant jobs that will be lost as the nation's power-generation system moves away from fossil fuels in the coming decades, finds a new study led by **Michael Craig**.



Faculty Accolades

Professor **Paul Mohai** was appointed senior policy adviser at the U.S. Environmental Protection Agency. He joined the Office of Environmental Justice as an expert on quantitative methods, data and tools to assess the impacts of multiple environmental and health burdens in socioeconomically vulnerable and environmentally overburdened communities.

Ivette Perfecto (MS '82, PhD '89), the James E. Crowfoot Collegiate Professor of Environmental Justice, was elected to the National Academy of Sciences, one of the highest distinctions for a scientist or engineer in the United States. Her research focuses on the impacts of agriculture on biodiversity and the relationship between biodiversity, ecosystem function and ecosystem services in agricultural landscapes.

Johannes Foufopoulos, an associate professor, has co-authored a new book, "Infectious Disease Ecology and Conservation," about how the general processes causing human disease outbreaks have led to the emergence of numerous new pathogens in wild animals. The book sheds light on the origins and extent of the worsening problem of wild animal diseases and offers solutions to evaluate and control wildlife disease outbreaks and address urgent conservation problems.

Sara Hughes, an associate professor, was appointed associate director of the Cooperative Institute for Great Lakes Research (CIGLR). She will expand CIGLR's social science research footprint within her field and more broadly. CIGLR recently was awarded a five-year, \$53 million renewal agreement from the federal government to continue and expand its work of helping to conserve and manage the region's natural resources.



Mohai



Perfecto



Foufopoulos



Hughes



Lindquist



Van Berkel



Newell



Reames



Weeks

SEAS faculty **Mark Lindquist**, **Derek Van Berkel** and **Josh Newell** are leading the new Sustainable Future Hub, which will support and transform sustainability decision-making on campus and beyond. The hub's objectives are to 1) develop tools and techniques that can rapidly visualize diverse collections of data, including mapped landscapes, environmental change and social networks, 2) implement and evaluate novel methods for visual interaction with these data, and 3) evaluate the effectiveness of these visual media on decision-making. Their approach will bolster existing research in assessing extended reality, visualization, crowdsourcing and citizen science as novel techniques for broadening community engagement and scientific discovery.

Tony Reames, deputy director for energy justice at the U.S. Department of Energy (DOE), was awarded the Jan Brinch Award for Collaboration in Public Service by the National Council on Electricity Policy at its annual meeting in September. Reames, an associate professor at SEAS who is on leave while serving in the DOE, received the award in recognition of his widely influential research into the intersections of affordability, access to clean energy resources and related disparities across race, class and place, which has been the cornerstone of discussions about equity among policy makers at all levels of government.

Brian Weeks, an assistant professor, received a Packard Fellowship in Science and Engineering from the David and Lucile Packard Foundation. He is one of 20 early-career scientists and engineers who will each receive \$875,000 over five years to pursue their research. Weeks is an evolutionary ecologist who studies how bird species and bird communities have responded to environmental change.



Program in the Environment Celebrates 20 Years

Story by
Shelie Miller

This fall, the Program in the Environment (PitE) is celebrating its 20th anniversary. PitE Director Shelie Miller, who is also the Jonathan W. Bulkley Collegiate Professor of Sustainable Systems and a U-M Distinguished Faculty Fellow in Sustainability, shares the program's history and focus.

The natural sciences have been well represented on the University of Michigan's campus since the early 20th century. Nevertheless, the environmental movement of the 1960s that prompted the first Earth Day in 1970 catalyzed new directions in environmental curricula. SEAS, which was then called the School of Natural Resources, offered a BS degree in natural resources that focused on environmental science. Meanwhile, the Residential College, which is housed within the College of Literature, Science and the Arts (LSA), also began introducing interdisciplinary environmental courses. Interest in these programs continued to grow as greater numbers of faculty and students across campus became more involved in studying environmental problems. In 1992, the cross-campus initiative focused on global change was launched, which developed innovative and interdisciplinary undergraduate coursework and a minor that integrated the science of global environmental change with strategies for effective economic development and resource management.



FOR 20 YEARS, THE PROGRAM IN THE ENVIRONMENT HAS ENABLED UNDERGRADUATE STUDENTS TO PURSUE THEIR PASSION FOR ENVIRONMENTAL ISSUES.

“

What started as a relatively small undergraduate program of 50 students has flourished over the past 20 years, with an undergraduate population of approximately 350 majors and 350 minors.”

PitE was formed in 2002, in part to help coalesce and synergize the various environmental undergraduate offerings on campus. As a jointly managed degree program between SEAS and LSA, PitE offers students a broad liberal arts major that emphasizes critical thinking, problem-solving, communication and forming connections across a range of topics and disciplines. Over the years, PitE has developed four additional minors in sustainability, food, energy science and policy, and water to the original environment major and minor. The PitE curriculum also offers students a wide variety of coursework and experiences to pursue their passion for environmental issues. Students have taken courses at the U-M Biological Station and Camp Davis, studied abroad in locations ranging from Tanzania to New Zealand, and spent semesters in Detroit and Washington, D.C.

What started as a relatively small undergraduate program of 50 students has flourished over the past 20 years, with an undergraduate population of approximately 350 majors and 350 minors. Faculty associated with the program have also grown tremendously over the past two decades; over 50 faculty are now affiliated with PitE. Showcasing its reach and breadth, PitE has faculty that are jointly appointed in six schools and colleges across the university (SEAS, LSA, Engineering, Public Health, Urban Planning, and Art and Design) from 14 different disciplinary units.

Let’s raise our reusable water bottles to another 20 years of PitE! ♻️



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Fitzmaurice

Class Notes

1970s

Donald L. Dworsky (MS '71) has established the Dworsky Award in Water Resources Governance at SEAS. The endowed award provides an annual monetary prize to a student who has submitted the highest quality paper on water resource management. Topics include institutional governing arrangements, management of water quality and supply, water policy and more. The award was established to promote scholarship in this field and to encourage students to consider careers in the public administration of American water resources. The award is named after the three Dworsky family members who attended SEAS and went on to administer natural resources policy in various governmental organizations: Donald; his brother, **Richard F. (BSF '65)**; and their father, **Leonard B.**, who completed doctoral studies at SEAS from 1955 to 1956.

1980s

Ellen Airgood's (BS '88) latest novel, "Tin Camp Road," was released earlier this year. Set in Michigan's Upper Peninsula, the book focuses on a young single mother and her 10-year-old daughter who "stand up to the trials

of rural poverty and find the community they need in order to survive." Airgood and her husband, Rick, operate a diner together in Grand Marais, Michigan.

1990s

Kerry Fitzmaurice (BS '91) launched Pure Grit BBQ, described as "the first-ever 100% plant-based fast-casual BBQ in NYC," last May. "I figured the best thing I could do for the environment was create a brand and food that celebrated the best of barbecue, sharing and community, with plants," Fitzmaurice says. "We celebrate all BBQ lovers and welcome everyone to pull up a chair. No food politics and no judgment. Check out the Pure Grit BBQ website at puregritbbq.com."

2000s

Michigan State Rep. John Cherry (BA '07) is serving his second term representing the 49th House District, which comprises the cities of Flushing, Mount Morris and Swartz Creek, part of the city of Flint, and Flint and Mount Morris townships.

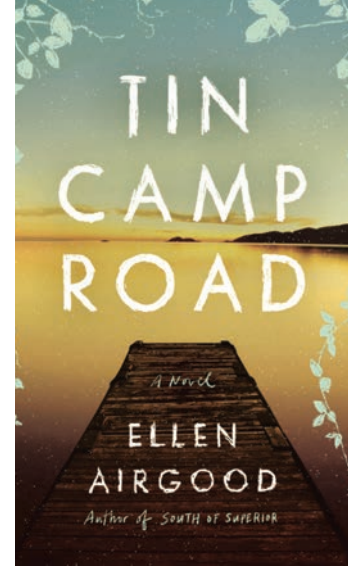
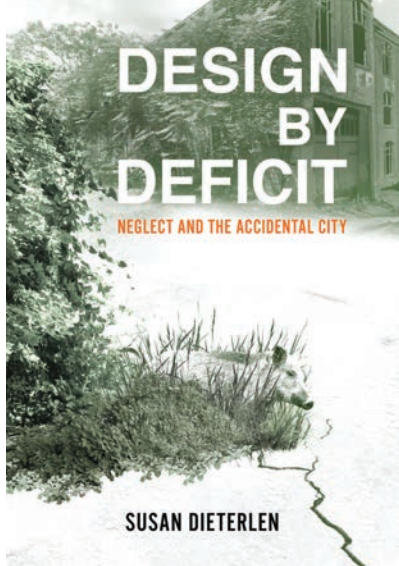
Susan Dieterlen (MLA '04, PhD '09) published a new book, "Design by Deficit: Neglect and the Accidental City,"

about how everything we *don't* do shapes our surroundings, our lives within them, and our struggles with climate change, inequality and public health. Dieterlen is the founder of DeftSpace Lab, where, as a researcher and designer, she focuses on sustainability, clean energy and how people interact with environments.

Leslie Garrison (BA '09) is director of commercial charging deployment at Rivian, an electric vehicle automaker and automotive technology company. She leads the team executing the design and construction of all Rivian charging offerings.

José González (MS '09) received the 2022 Heritage Award from the Aquarium of the Pacific for his work with Latino Outdoors, a Latinx-led community and organization that is focused on building family and celebrating culture and heritage in the outdoors. González is the founder and director emeritus of Latino Outdoors. He currently is a partner at The Avarna Group, which helps businesses integrate social and environmental justice awareness, policies and culture within the workplace.

Meghan Miner Murray (BS '06) is a freelance writer/researcher and a senior editorial researcher for *National Geographic Magazine*. She writes: "Greetings from Kona on Hawaii Island! I've been living and working as a freelance journalist specializing in



travel and environmental topics for the past eight years. I'm an avid scuba diver, certified PADI Divemaster and hobbyist underwater photographer. I'd love to connect with anyone heading this way, in the same field or who I may have lost touch with." Follow her on Instagram @meghanminermurray.

Amy Senter (BS '08, MS '11) is the global director, food and finance, at the World Business Council for Sustainable Development. She works with the chief executives of more than 200 international corporations and financial institutions to accelerate industry transformation of the global food and agriculture system.

Melissa Hopkins Taggart (MS '05) has joined the U.S. Forest Service as an environmental education specialist. She previously worked for seven years at the North American Association for Environmental Education.

2010s

Stefania Almazán-Casali (MS '16, PhD '20) started a new role as an engagement consultant for The Nature Conservancy's Water Facility.

Mike Barg (MS/MBA '17) has started a new position as vice president, partnerships at Shifted Energy in Denver. Shifted Energy designs and deploys energy storage and interactive demand response

solutions for grid operators and energy providers.

Madeline Baroli (BA '16) is a climate adaptation specialist at the Northern Institute of Applied Climate Science. She works with scientists and natural resource managers to support the integration of climate change considerations and adaptation approaches into land management, with an emphasis on forest ecosystems.

Zoe Berkery (BA '12) is the chief operating officer at CleanCapital, a renewable energy investment platform. She is responsible for the management and optimization of CleanCapital's growing fleet of clean energy assets; she also oversees corporate operations.

Jennifer Carman (MS '15, PhD '20) is now the deputy research manager at the Yale Program on Climate Change Communication. She develops and supports survey research on public attitudes, behaviors and policy support regarding climate change in the United States and globally.

Chelsea Lisiecki (MS '19) and her husband, Michael, opened Carosello Pasta in Dexter, Michigan. The business offers fresh and fried pasta as well as other specialty food items.

Cybelle Shattuck (MS '11, PhD '16) was granted tenure and promoted to associate professor at Western Michigan University.

She holds a joint position in the Institute of the Environment and Sustainability and the Department of Comparative Religion.

"Level Up," a song by **Cynthia Shih (MS/MBA '13)**, a singer/songwriter performing under the name Vienna Teng, was featured in U-M's 2022 welcome-back video, "This is Your Day, No Other!" The video can be found on YouTube. Shih has been a performing songwriter since 2002 and has released five studio albums. She also is the senior adviser, global insights and strategies for the environmental nonprofit Delterra.

2020s

Alex Killion (PhD '21) has a new job as the managing director of the Center for Biodiversity and Global Change at Yale University. The center's efforts focus on global biodiversity research, conservation and policy.

Did you get a new job or a promotion? Were you recognized with an award? Share your news with us!

Email seas-alumni@umich.edu or complete the form at seas.umich.edu/alumni/class-notes.

A MAN OF ENERGY

The year after he graduated from SEAS, **Oluwafemi (Femi) Sawyerr (MS '15)** found his dream job at Energy and Environmental Economics Inc. in San Francisco, rising from associate to his current role as managing consultant.

“When I dreamed of being an energy consultant, I wanted to do analysis that would guide state and federal regulators in their planning of the electricity sector,” says Sawyerr. “That’s literally what I do right now.”

Originally from Nigeria, Sawyerr has an informed understanding of the challenges faced by developing countries in their effort to improve infrastructure, as well as the importance of renewable energy and sustainable manufacturing in a world impacted by climate change.

He relates that one of his most cherished professional achievements was serving as the lead analyst in the first independent study that assessed the potential impact of offshore wind on the California electricity sector. That study served as a data source for further governmental studies to which Sawyerr also contributed.

Experiences like these keep Sawyerr optimistic about tackling sustainable energy challenges.

“The nature of my work provides me with the opportunity to witness what happens ‘in the kitchen’ before clean energy policies and regulations are made,” says Sawyerr. “Thus, I have a better appreciation for what some policies are really seeking to achieve, and some of the real-world considerations that need to be incorporated in these policies, beyond just the math and economics.”

In addition to his role as an energy analyst, Sawyerr is deeply moved by a very different form of energy—one that he often brings to the stage. As a semi-professional



dancer, Sawyerr has performed and competed in salsa and bachata routines across the country, including Ann Arbor, Salt Lake City, San Francisco and Reno.

“I don’t think of dance as something I do, but rather as part of who I am,” says Sawyerr. “The experience of listening to music and letting my body interpret what I hear through motion is a feeling I can never get enough of. Whether that’s social dancing for fun or on stage in performance, the joy it gives me is difficult to really describe in words.”

Sawyerr recalls that he always loved dancing, even before he knew what it was.

“It is said that my paternal grandmother’s lullaby for me, when translated into English, was ‘Let him dance. Just let him dance.’”

—Denise Spranger

SUPPORTING ACTIONABLE ENERGY

SOLUTIONS

Akshat Kasliwal (MS '19) has devoted his career in energy and sustainability toward the implementation of triple-bottom-line solutions on larger and more systemic scales. His experiences have ranged from working for Shell and Ford Motor Company to advising power-sector stakeholders on infrastructure investments and strategy at PA Consulting.

An ongoing project of his has been supporting Invenergy's development of its 800-mile Grain Belt Express. Spanning from southwestern Kansas to Indiana, the high-voltage direct current (HVDC) transmission line will carry clean, affordable and reliable power to millions of people, notes Kasliwal. It is projected to create thousands of jobs, reduce greenhouse gas emissions by millions of tons and add low-cost power to utility portfolios.

"[I find it] very gratifying when my work is able to support and facilitate actionable real-world solutions that simultaneously maximize benefits to people and the planet, without compromising on profitability," he says.

Kasliwal adds that "my two years at SEAS were the best of my life, in that they were all that I had hoped for (and much more)." SEAS enabled him to refine his knowledge of the technical and engineering aspects of infrastructure systems, as well as understand the financial, commercial and political facets of the energy and mobility sectors. He describes the projects he was involved with at SEAS—on topics such as flying cars and autonomous vehicles, circular economy and Scope 3 emissions—alongside being part of an academically and socially diverse cohort, as "life-changing experiences that taught me transformative lessons."

—*Juliette Quenieux*



ENVIRONMENTALLY SAFE PEST CONTROL



Salata & Benny

Esther Salata (MS '15) has always had an issue with mosquitoes. They've not only shown up throughout her various educational and career pursuits but, when the pandemic hit, she realized that the issue had become a buzzing nuisance. Like others navigating the pandemic, Salata found herself spending more time outdoors, which meant facing the mosquitoes head-on. To keep them at bay, she tried candles, sprays and other gadgets, and, for a moment, considered chemically treating her yard. Ultimately, she decided against it due to the potential risks not just for her dog, Benny, but also to wildlife and the environment.

These concerns started Salata on a quest to find a safe option with low toxicity. When she didn't find anything suitable at her local hardware and garden stores, she decided that she, along with her chemist-husband, should create a safe, effective solution to their problem. In November 2020, they started developing a plant-based yard and garden spray called Benesafe Solutions. By May 2021, the small business had launched a product comprised of a few ingredients that the U.S. Environmental Protection Agency has listed as posing a low risk to people, pets and the surrounding environment.

As the founder, owner and sole employee of Benesafe Solutions, Salata juggles it all and attributes the drive to

keep growing the company to her SEAS experience. "As a small business owner, I wear a lot of hats," says Salata. "It's been a learning experience, and I always think back to my time at SEAS and the people I was surrounded by, all like-minded and environmentally conscious. I knew I belonged there the minute I arrived. That experience truly empowered me to want to go out and change the world. I'm so proud of creating Benesafe Solutions, an eco-friendly and minority-woman-owned pesticide business in an otherwise male-dominated industry."

Benesafe is sold in 21 stores and vet clinics in Pennsylvania and Ohio and is being used by local landscaping companies. Salata is in the process of seeking efficacy data that will further support her marketing efforts as she grows the business to include solutions that will address other pest problems. "My hope is that as we develop more products and reach more people, they will become more conscious about the chemicals they use around their homes and embrace the importance of sustainability in everyday life."

—*Nayiri Mullinix*

A CHAMPION FOR JUSTICE



Karen DeGannes (MS '91, PhD '13) came to U-M with a “fire in her belly for clean energy and climate.” She had enrolled in U-M’s urban planning program, but was encouraged to explore SEAS by her adviser, who knew that her environmental interests could be more fully developed at the school.

DeGannes’ introduction to environmental justice (EJ) was through the NR 576 course, co-taught by Professors Bunyan Bryant and Patrick West. It convinced her that SEAS was the right fit—even as it forced her to step outside her comfort zone. An early assignment involved interviewing residents whose homes were near the Sumpter Landfill.

“I didn’t want to do it. I was new to Ann Arbor, I didn’t have a car or a driver’s license, and I had to figure out how to get the courage to walk up to people and start talking to them about their neighborhood,” DeGannes says. “It broke me in, and that was the start of a long journey that has led to an amazing career.”

DeGannes’ career has included co-founding a nonprofit, Environmental Justice Solutions, with SEAS graduate Torri Estrada (MS '97). DeGannes also consults with EJ organizations and local governments on decarbonization and energy transition with an emphasis on supporting frontline communities in the creation of neighborhood energy and climate resilience centers. This is in addition to her full-time work as the environmental justice lead for Pacific Gas and Electric.

DeGannes, a member of SEAS’ External Advisory Board, attributes her success to her SEAS education, which she says instilled in her the need for evidence-based approaches and collaboration and a sense of community.

It also gave her a front-row seat to SEAS’ budding EJ program. DeGannes attended the 1990 Michigan Conference on Race and the Incidence of Environmental Hazards, which helped to legitimize environmental justice as an academic endeavor and contributed to President Bill Clinton signing Executive Order 12898 to address environmental justice in minority and low-income populations. “I sat on the floor in a room while the Principles of Environmental Justice were being developed

and debated,” DeGannes recalls, “and it was amazing and inspiring to be one of those students surrounded by all the leaders and supporters of the EJ movement from across the country.”

Having completed her master’s thesis on the unintended impacts of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) on urban redevelopment (brownfields), DeGannes started the first day of an internship with the U.S. EPA only to discover that the agency was tasked with writing a Congressional white paper on the same topic.

DeGannes’ manager supported the idea of her thesis research becoming the basis for the EPA’s white paper, but it took some convincing before other agency experts accepted the idea. “Those scientists weren’t going to just listen to some upstart student from U-M,” DeGannes says. “The way I had to get their agreement was to build relationships and demonstrate that my technical chops were solid, which goes back to my Michigan education.”

After reformulating her master’s thesis research for submission as the EPA’s white paper on brownfields, DeGannes followed it up by writing the EPA’s white paper on environmental justice; it was submitted to Congress as part of CERCLA reauthorization in 1993-1994.

While DeGannes admits these experiences were “mind-blowing,” she doesn’t think they are all that unusual. “These types of stories are true for a lot of SEAS students,” she says. “We come out of SEAS with a combination of amazing skills and different experiences, and we do interesting things in the world. It’s just part of our DNA.”

—Lori Atherton

RIGHTING WRONGS IN SOCIETY

At SEAS, **Jada Koushik (MS '08)** had the opportunity to work with Professors Bunyan Bryant and Rebecca Hardin, which had a significant impact on the trajectory of her career. Although much of it was spent working in public health, Koushik's work has always centered on environmental justice.

Koushik earned a master's degree in public health from Tulane University in 2002 and, in her career as an epidemiologist, was focused on communicable diseases and lead poisoning. In 2008, after graduating from SEAS, her family moved to Canada, where she has worked and studied since. For several years she continued to work in public health but eventually decided it was time to pursue a PhD, which she earned in June 2022 from the University of Saskatchewan's School of Environment and Sustainability.

"I've always seen the connection between public health, sustainability and environmental justice. Every little step I've taken has been building on my experiences, and I see the culmination of that in my PhD," says Koushik. "For my PhD research, I looked at sustainability education and place (the land you live on and how that matters), working closely with school districts in Canada to learn what they were doing to promote sustainability, green spaces and engagement with Indigenous communities."

Koushik's research revealed that schools were focused on the basics, such as recycling, but were doing next to nothing to engage local and Indigenous communities. Her research supported the need for a dedicated dialogue between educators, administrators and students about social and cultural dimensions of place, especially territorial acknowledgment, and possibly a more formal curriculum to reinforce these messages to support whole-school approaches to sustainability.

Koushik is now a postdoc at Wilfrid Laurier University. Her research focuses on anti-racism and oppression. She asks questions about experiences of racism on campus, how it has impacted individual health and how it spills over into personal lives. "What I find heartbreaking is that across all participant



types—deans, faculty, students, staff—they say, 'I'm so happy somebody is letting me speak and is listening to me.' Since racism and discrimination are my focus, I hear stories about what they have to deal with and the lasting effects on their lives and work, including how their experiences can impact whether or not they continue with higher education. This isn't exactly environmental justice, but I feel that it's in line since I am still working to right wrongs in society," says Koushik.

In addition to her research, Koushik is formulating modules for anti-racism work on campus and also teaching an environmental justice course at Waterloo University. "I love research and that type of interaction, but my highest passion is teaching," says Koushik. "I often think about how, at SEAS, I worked with the most inspiring teachers who are some of the biggest names in environmental justice. Working with such highly regarded and respected people who are so grounded had such an impact on me and my career. My experiences at SEAS were priceless and invaluable and continue to inspire me to this day. I received a foundation that I've been able to build upon as I progress through my career."

—*Nayiri Mullinix*

MOBILITY AND TRANSPORTATION

DESIGN

Oliver Kiley (BS '03, MLA '08) began his career at SmithGroup, an international architectural firm with deep roots in Detroit and Ann Arbor, just after earning his degree in the Master of Landscape Architecture program at SEAS. In recent years, he has been elevated to a principal landscape architect at SmithGroup's Ann Arbor office.

SmithGroup is a multi-disciplinary, integrated-design firm that combines landscape architecture, civil engineering, architecture, urban design and planning disciplines to create resilient and sustainable places and communities.

Kiley is one of the co-leads in the firm's mobility specialty, an area that he helped to develop.

"Our work is at the intersection of mobility and transportation design," says Kiley. "We look at whole road corridors and figure out how to make those safer, more accessible and more comfortable for people—whether they're walking, biking, taking the bus or driving their car."

Kiley says SmithGroup gives thought and attention to the aesthetic design—as well as functional considerations—to create inviting spaces that include features such as pocket parks, plaza spaces, seating areas and other amenities.

Ann Arbor residents will be familiar with numerous projects that SmithGroup has completed in partnership with the Downtown Development Authority—such as the William Street Bikeway, the more recent First Street Bikeway, and the reconfiguration of the Fifth Street and Detroit Street area that encompasses the farmer's market and Community High School.

Kiley, who was involved in the design and engineering work on these "people-friendly streets," says the aim is to make downtown Ann Arbor more inclusive, safe and accessible.

Asked what changes he's seen in the field over the course of his 14 years at SmithGroup, Kiley discussed several shifts in priorities and perspectives.

"One of the big drivers that is shaping the way that landscape architects are practicing is an emphasis on community resiliency, and how that relates to climate change from a mitigation and adaptation standpoint," says Kiley. "To prepare for climate outcomes such as more intense and more frequent rainfall events, the need to design our streets to be more flexible and resilient is critical.

"Another huge driver is from the perspective of equity. There's a lot more sensitivity now, and a recognition of the impacts that our projects can have, such as gentrification and unintentionally displacing people. To address those issues, our engagement processes need to be much more inclusive in working with the community to figure out how to make changes in a way that's harmonious with community needs—making sure that we're not creating inequities, but instead, we're confronting those historic inequities."

—Denise Spranger



LEADING SUSTAINABILITY-FOCUSED EDUCATION

Jean MacGregor (BS '67, MS '71) has championed sustainability-focused education throughout her career. She is passionate about the “importance of ongoing communities tackling the huge adaptive challenges that sustainability presents.” Highlights of her career include supporting the establishment of the environmental studies program at Warren Wilson College in North Carolina, instructing at the Evergreen State College in Washington and leading a variety of national projects on learning communities in higher education.

Her favorite endeavor, however, was founding and leading Curriculum for the Bioregion from 2004 to 2018. This project is a regional sustainability-across-the-curriculum initiative, originally based in the Puget Sound bioregion and the Columbia Plateau. Seeing a gap between the exclusion of sustainability topics in curricula and its increasing importance as an issue in the 21st century, MacGregor created this project with the goal of mobilizing higher education to situate sustainability and environmental justice content and concepts in a broad array of disciplines, ranging from philosophy and biology to mathematics.

“If our courses can be visualized as trees, sustainability content needs to become part of the trunk, holding up and nourishing the whole tree,” MacGregor explains. With that lens, adapting curriculums to include sustainability and environmental justice topics became a collaborative effort with professors, individualized based on course curricula.

By linking and building communities of educators, Curriculum for the Bioregion has grown to involve over 50 colleges and universities, close to 1,000 faculty and students, and dozens of community experts in agencies such as the U.S. Environmental Protection Agency, nongovernmental organizations and tribes.

—*Juliette Quenieux*



A LIFELONG PASSION FOR TREES

Lauren Marshall's (MLA '10) passion for trees runs deep, having grown over the course of a lifetime.

Marshall grew up in suburban Washington, D.C., where she first developed her connection to the natural world. Forest patches were scattered throughout her family's neighborhood, and those trees were her playground. "I grew up with parents who really just let me run wild in the neighborhood. And then at dinner, they would call out the door. I would emerge from whatever forest I had been scrapping around and come in to eat," says Marshall. "When I think about trees, even today, there's this deeply entwined sense of home and family for me. That stems from those early playtimes as a kid."

In college, that passion only grew. Marshall studied plant science at Cornell University and had the opportunity to study abroad in Costa Rica. She interviewed Indigenous farmers who were part of an organic banana cooperative, learning more about how they grew their bananas as a part of forest systems and the economic benefits that these systems provided. It was then that everything fell into place for Marshall. "What I realized on this trip was that what I really loved was studying the way people interact with the land and how that influences ecology, health and biodiversity."

After completing her undergraduate studies, she earned her master's degree in landscape architecture from SEAS. In her final year of grad school, Marshall was accepted into the USDA Forest Service's Presidential Management Fellows Program. This led to a long career working in several different facets of forestry. Marshall worked to restore millions of acres of forest landscape, helped to develop some of the first national geospatial reporting requirements and even spearheaded design work to make recreational infrastructure more sustainable.



Marshall is now putting her knowledge and passion to use in the nonprofit sector at the Arbor Day Foundation, where she is senior manager of program innovation. "This is a great opportunity for me to work with people both within the organization and our partners. There are so many creative people working in the forestry space and so many sparks of ideas everywhere."

—*Kim Peacock*

This is a shortened version of an article that originally appeared on the Arbor Day Foundation Blog. It is reprinted with permission.



THE CLASS OF 2024 POSES WITH SEAS FACULTY AND STAFF FOR A GROUP PHOTO AT THE U-M BIOLOGICAL STATION.

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