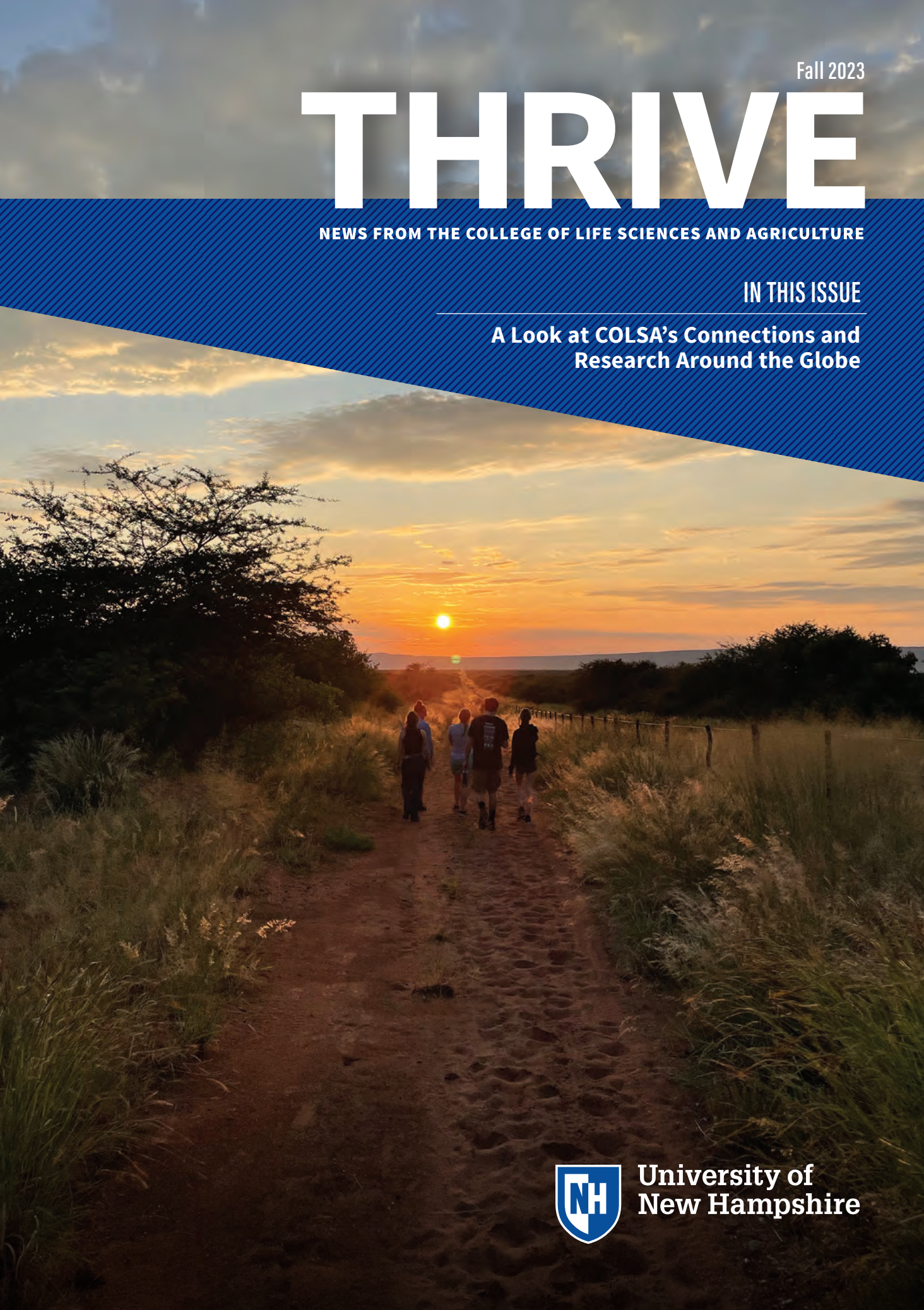
Fall 2023

# THRIVE

NEWS FROM THE COLLEGE OF LIFE SCIENCES AND AGRICULTURE

IN THIS ISSUE

**A Look at COLSA's Connections and Research Around the Globe**



University of New Hampshire

# NETWORK CONNECTIONS

In this issue of THRIVE, we celebrate the long and strong history of the UNH College of Life Sciences and Agriculture's global impact in teaching, research and service — and highlight some members of our community who are working hard to continue this impact and make positive change around the world. The critical issues that face our ecosystems and economies are globally connected; to best address them, our researchers and practitioners need to be globally connected as well.

Building meaningful collaborations and partnerships that enhance academic capacities and competencies is a critical step in making real change. Especially in a post-pandemic world, we must rekindle, and in many cases build, strong bonds that span oceans and continents to address water security, ecosystem and human health, biomedical advances, food production and more. We can do this best by bringing together our most creative people and focusing on the gains that come from scientific discovery and practice and a passion for learning and sharing.

The global reach of our college also presents important and unique opportunities for our students to expand the scope of their campus-based academic programs. In this issue, you'll learn of students advancing their knowledge and skills in Namibia, New Zealand and Sweden — just a sampling of the many places that our students find themselves on their academic journeys.

Whether we are bringing global partners to New Hampshire or traveling afar ourselves, our academic community is an active hub of engaged research, teaching and service. Thank you for taking the time to learn more about our work and being part of the COLSA community!

Warm regards,

**ANTHONY S. DAVIS**
Dean, College of Life Sciences and Agriculture

**ON THE COVER**

*UNH students (L-R)* ***Diana Stover '23, Andrea Majewski '23, Clara Manley '23, Luke Conroy '23*** *and* ***Megan Vetter '23*** *returning to their campsite after watching the sunrise from Leopard Hill at the Cheetah Conservation Fund in Otjiwarongo, Namibia. Photo credit:* ***Robert Pease '23***

# THRIVE CONTENTS


Food Insufficiency Among LGBTQ+ ..... 3

$10M NIH Center Grant Renewed ..... 3

2023 Awards & Honors ..... 4

Points of Interest ..... 5

Advancing Knowledge Through Partnerships ..... 6

Outside the Classroom, Students Are Transformed ... 7

Fishy Business ..... 9

Saving Sought-After Sea Snails ..... 10

Growing the Family Business ..... 11

Mitigating Threats to Africa's Carnivores ..... 14

Caribbean Partnership Expands ..... 15

Listen Up ..... 17

Where Permafrost Thaws ..... 20

Whale Watcher ..... 21

Critical Training on Critical Zones ..... 22


University of New Hampshire
College of Life Sciences and Agriculture

# STUDY EXAMINES FOOD INSUFFICIENCY AMONG LGBTQ+ NEW ENGLANDERS

Research by a team of scientists, including **Analena Bruce**, assistant professor in the department of agriculture, nutrition, and food systems, has found that while cisgender New Englanders experience a lower rate of food insufficiency when compared with their peers in other parts of the country, the region's LGBTQ+ residents experience a rate of food insufficiency that is two to three times higher than that found among cisgender New Englanders. Their findings are helping to highlight the ways existing policies and programs that address food insecurity continue to underserve New Englanders, and especially LGBTQ+ people.

Bruce, along with co-authors **Jess Carson**, a research assistant professor at the UNH Carsey School of Public Policy, and **Isaac (Ike) Sohn Leslie '16G**, an extension assistant professor of community development at the University of Vermont, who led the research, published their findings in the journal *Agriculture and Human Values*.

"Our analysis shines a light on this reality that who you are — the color of your skin, your gender identity, your sexuality — is playing a significant role in whether or not you have enough food to eat," says Bruce. "Even in a politically progressive region — New England has lower rates of food insufficiency than the country as a whole — we have these very stark disparities in our food system that reflect systemic discrimination and marginalization."

# $10 MILLION NIH GRANT SUPPORTS CONTINUED HUMAN HEALTH AND DISEASE RESEARCH

The University of New Hampshire's Center of Integrated Biomedical and Bioengineering Research (CIBBR) has been granted a second $10 million award from the National Institutes of Health (NIH), enabling the center to continue advancing cutting-edge interdisciplinary research and foster innovation in the biomedical and bioengineering sciences to tackle complex challenges in human health and disease. CIBBR's research portfolio encompasses cancer biology, tissue engineering, molecular and behavioral neuroscience, biosensors, multiomics and bioinformatics.

Since CIBBR's inception in 2017, its investigators have received $13.1 million in grant awards — doubling NIH funding to UNH — and generated 128 publications. The center has facilitated the hiring of 14 new faculty in NIH-relevant disciplines and invested $1.9 million in new research instrumentation.

The new five-year Centers of Biomedical Research Excellence (COBRE) award will continue to increase research capacity at UNH through the hire of eight early-stage and senior-level researchers, expansion of research instrumentation and the creation of an innovative Data Science Core to provide bioinformatics, biostatistics and data analytics services to UNH researchers. CIBBR will continue to foster collaborations with other academic institutions and industry partners to facilitate knowledge exchange, promote technology transfer and ensure that basic discoveries in biomedical and bioengineering science can be applied to improving human health.

# 2023 AWARDS & HONORS

## COLLEGE AWARDS

### 2023 COLSA Teaching Excellence Award

**Jennifer Purrenhage**, senior lecturer, department of natural resources and the environment

### 2023 COLSA Outstanding Advisor Award

**Janet Anderson**, senior lecturer, department of biological sciences

### Dean's Awards for Distinction

**Maria Carlota Dao**, assistant professor, department of agriculture, nutrition, and food systems

**Katie Cousens**, director, advising and academic success

**Rob Gibson**, managing director, New Hampshire Veterinary Diagnostic Laboratory

**Amy Michaud**, coordinator, microbiology teaching laboratory, department of molecular, cellular, and biomedical sciences

**Wil Wollheim**, associate professor, department of natural resources and the environment

### COLSA Community of Teaching and Research Scholars Award

**Sarah Walker**, assistant professor, department of molecular, cellular, and biomedical sciences

### Shiva and Elizabeth Nanda Award for Innovation

**Kelsey Meyer**, doctoral candidate

### 2023 Gold Quality Award from Dairy Farmers of America

Fairchild Dairy Teaching and Research Center

### Dairy One, Outstanding Quality Milk Award

Fairchild Dairy Teaching and Research Center & Organic Dairy Research Farm

### UNH Graduate Student Teaching Award

**Emily Whalen '18G**, doctoral candidate

### UNH Sustainability Awards

#### *Faculty Lifetime Achievement*

**Joanne Burke**, clinical professor emerita, department of agriculture, nutrition, and food systems

**Mary Friedman**, principal lecturer emerita, department of natural resources and the environment

#### *Faculty Campus and Community Engagement*

**Amy Taetzsch '09**, clinical assistant professor and director, nutrition and dietetics master's program, department of agriculture, nutrition, and food systems

#### *Faculty Emerging Research: Teams*

LGBTQ+ Food Insufficiency Research Team: **Analena Bruce**, assistant professor, department of agriculture, nutrition, and food systems; **Jess Carson**, research assistant professor, Carsey School of Public Policy; **Isaac Sohn Leslie**, postdoctoral research associate

#### *Faculty Established Research*

**Bonnie Brown**, professor and faculty chair, department of biological sciences

#### *Alumni Lifetime Achievement*

**Sharon Runge '83**

### National Fellowships and Scholarships

**Kennedy McGrath '25**, NOAA Ernest F. Hollings Scholarship

**Emma McGuire '24**, NOAA Ernest F. Hollings Scholarship

**Luke Botticelli '23**, National Science Foundation Graduate Research Fellowship Program Award

### COLSA URC Awards

#### *Most Outstanding Oral Presentation*

**Izzy Lopez '23**

#### *Most Outstanding Poster Presentation*

**Abby Lebsack '23**

#### *Award of Excellence*

**Cameron Banks '22**

**Casey Baumann '24**

**Eleanor Braun '23**

**Nicholas Clarke '23**

**Sam Comeau '23**

**Tori Denovellis '23**

**Heather Nelson '23**

**Olivia Smith '24**

**Mark Troiani '23**

**Tucker White '23**

### COLSA Distinguished Alumni Award

**Elle Purrier St. Pierre '18**

### COLSA Honorary Degree

**Bill Leak '23H**

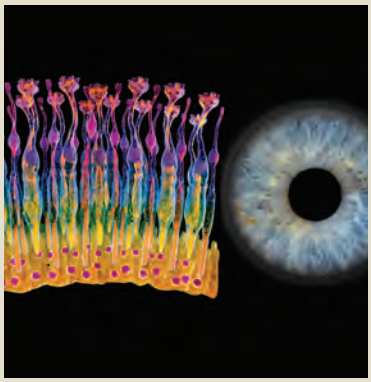
POINTS OF INTEREST

## A LEGACY LIVES ON

**Arthur Mathieson**, professor emeritus of biology, phycologist and former head of the UNH Jackson Estuarine Laboratory, passed away in fall 2022, leaving behind a legacy of publications on marine botany and a collection of nearly 80,000 herbarium specimens. **Erin Sigel**, manager of the Albion R. Hodgdon Herbarium, worked with Mathieson's wife, Myla Mathieson, and University Archivist and Interim Special Collections Librarian **Elizabeth Slomba** to permanently transfer Mathieson's research notebooks to the UNH Archives, making this fascinating part of scientific history available to anyone who is interested. These documents and specimens serve as the best records of the marine algae of coastal New England and adjacent Canada.

## SHEDDING LIGHT ON DEGENERATIVE EYE DISEASES

UNH scientists led by **Rick Cote**, professor in the department of molecular, cellular, and biomedical sciences and director of the Center of Integrated Biomedical and Bioengineering Research, continue to receive funding for their research into retinal degenerative diseases. The latest $1.5 million grant extends three decades of continuous funding from NIH to support research examining visual signaling pathways in rod and cone photoreceptor cells responsible for the first events in vision. Understanding the visual signaling pathway's central enzyme, called phosphodiesterase-6 (PDE6), is critical for improving our ability to predict whether genetic mutations of PDE6 or the proteins that regulate it are likely to cause visual disorders or blindness.



## HOW SWEET IT IS

Maple syrup may have some friendly competition soon. New research conducted by New Hampshire Agricultural Experiment Station scientists examined how tapping trees other than maples — for example, birch and beech, which the Granite State has in abundance — could increase the economic resilience of the state's syrup producers. The syrups would offer intriguing alternatives to breakfast staples while supplying important ecosystem benefits. Doctoral candidate **David Moore** led the research, which focused on finding best management practices for harvesting sap and producing syrup from a variety of deciduous trees native to New Hampshire.

## AN AWARD TO SUPPORT INNOVATIVE IDEAS

In 2022, a donation to COLSA from **Shiva Nanda '87G** and his wife Elizabeth funded the Shiva and Elizabeth Nanda Award for Innovation. The annual award provides roughly $10,000 in seed funding to a student or students who have an early-stage idea that has commercialization potential and will have a positive economic, social and/or environmental impact. In 2023, **Kelsey Meyer**, a doctoral candidate in the marine biology program, received the award to support her work with local oyster farmers. As coordinator of the NH Shellfish Farmers Initiative, Meyer communicates with key decision-makers in the state about oyster farmers' role in aquaculture sector growth and oysters' ecological benefits. She also supports habitat restoration projects that serve a range of industry stakeholders.

# Advancing KNOWLEDGE through PARTNERSHIPS

## Collaborations in Puerto Rico, Bangladesh support research and education

Change doesn't occur in a vacuum. It often requires building partnerships, sharing ideas and even crossing borders. This understanding fuels many collaborations at the college, including two current projects with partners in Puerto Rico and Bangladesh.

COLSA has long had a research presence in Puerto Rico, and research and academic opportunities for the college continue to flourish there.

"If you look at the challenges that both Puerto Rico and New Hampshire face, there are a phenomenal number of parallels," says **Anthony S. Davis**, dean of COLSA. "So, building upon long-standing collaborative partnerships with our colleagues in Puerto Rico just makes sense."

Davis explains that Puerto Rico offers new ways of looking at solutions to complex problems like local food production, drought and water availability, and workforce development.

Beginning in 1982, Professor Emeritus **Bill McDowell** joined other scientists from around the globe and took the lead in establishing the world's longest-running tropical stream chemistry research program, focused on the watersheds of the Luquillo Mountains in northeastern Puerto Rico. Over the years, dozens of COLSA researchers have traveled to the island to contribute to this research. More recently, Research Assistant Professor **Adam Wymore** joined McDowell in studying this unique site.

This past summer, COLSA's connection to Puerto Rico expanded with the arrival of two students from the University of Puerto Rico at Mayagüez (UPR-M). **Eliudes S. Camps Marcano**, a horticulture student, conducted research led by COLSA agricultural scientists **Chris Hernandez**, assistant professor, and **Anna Wallingford**, research assistant professor. **Giovanni Quiñones**, a marine biology major, worked in associate professor **Gregg Moore**'s Coastal Restoration and Resiliency Lab.

At the same time, **Ethan Powell '24**, an environmental sciences: ecosystems major, spent the summer in Puerto Rico, participating in a groundbreaking rainforest warming experiment in the Luquillo Experimental Forest led by U.S. Forest Service scientists.

Some 7,000 miles away, new collaborations are connecting COLSA to one of the most populated countries in the world: Bangladesh. This tropical nation has grappled with deforestation and resource management and, more recently, the devastating impacts of climate change. In the past couple of decades, there's been a greater focus on sustainable forestry practices and education.

This past summer, Bangladeshi forestry students, faculty and researchers, government officials and NGO workers arrived in Durham to share practices and knowledge. The visit was part of an ongoing student and fellowship exchange organized by COLSA and Community Partnerships to Strengthen Sustainable Development, a project led by the U.S. Forest Service International Programs Office and funded by the U.S. Agency for International Development (USAID) Bangladesh.

A group of COLSA graduate students and faculty will complete a study tour of Bangladesh in early 2024.

"With these collaborations, we're better connecting our faculty to places where they can contribute the most," says Davis. "We do research where the research is needed, building lasting partnerships, and through this we can help advance teaching and service in areas of greatest need."

*The Bangladesh partnership team*

# EVEN FAR OUTSIDE THE CLASSROOM, **STUDENTS ARE TRANSFORMED**

## ECOQUEST: ECOLOGY IN ACTION

Students in COLSA's EcoQuest: Ecology in Action study abroad program expect hands-on research in fascinating ecosystems when they sign up to spend their semester halfway around the world in New Zealand. However, they may not anticipate the deeper insights they'll gain from navigating the dynamic socio-political environments within their field experiences.

The EcoQuest program is deeply embedded in the community, with board members from, and well-established research collaborations with, local iwi (tribes). One eye-opening experience occurs when students spend several days at a marae, a ceremonial meeting place for Māori, the indigenous people of Aotearoa. There, students learn about Māori culture and practices, as well as histories and issues that shape current policy, leading to an appreciation for indigenous perspectives in learning and research.

New Zealand also offers students a unique environment to study the nexus of research and politics. Due to its relatively small population of five million people, EcoQuest Academic Director and Co-Founder **Ria Brejaart** explains that the "distance between action on the ground and government can be quite short, and politicians are generally accessible." Over the years, planners for local authorities and members of Parliament have been guest speakers at EcoQuest.

As students conduct and analyze research in partnership with community groups, iwi, and scientists from regional authorities, their research findings make substantial contributions to several longitudinal projects and can inform local resource management decisions. Students also take a deeper look at how national and local policy decisions impact the ecosystems they study. This holistic approach allows them to fully appreciate how critical it is for scientists to successfully navigate the complex socio-political environments in which their research takes place.

"I knew I would leave New Zealand with incredible research experience, but what I did not know is that my connection with the Earth would be forever changed."

**Secilya Williams '24**

Another major draw of New Zealand is the breadth of exquisite natural environments. By the end of the semester, program participants will have trekked through alpine habitats, snorkeled in crystalline ocean and explored temperate rainforests. In addition to these formative adventures, students return to UNH confident that their work has made a positive impact on their temporary home in New Zealand — and empowered to apply what they've learned back home in the U.S.

"This trip brought to life the curriculum we've been taught in the classroom, creating an experience like no other."

**Lauren Noble '23**

# LIVESTOCK AND WILDLIFE MANAGEMENT IN NAMIBIA

In spring 2023, COLSA launched its Namibia study abroad program. **Andrew Conroy**, professor in the department of agriculture, nutrition, and food systems, led the nine-day trip during spring break. The trip is part of the semester-long Livestock and Wildlife Management course and is, in part, the result of three sabbaticals Conroy has spent in Africa since 1997, including one in Namibia as a Fulbright Scholar in 2008.

According to Conroy, Namibia offers excellent opportunities for students to learn about methods of livestock and wildlife management that are unlike anything they can see in New England. Namibia is a unique environment that can spark critical thinking about the sociocultural factors that loom large over animal management efforts. For example, the dynamics between the native African people and the predominantly white European settler populations have had a profound impact on conservation efforts and policy throughout this region.

During their expedition, students visited the Cheetah Conservation Fund, Etosha National Park, Mt. Etjo, a private game reserve, a German-owned guest farm and the community-owned ≠Khoadi-//Hôas Conservancy. Each site uses a different approach to managing its wildlife and livestock populations; students reflected on how the techniques they learned in class might translate when applied to complex real-life scenarios.

The ≠Khoadi-//Hôas Conservancy, which is managed by the local native community, was a particularly meaningful stop for students, according to Conroy. Observing firsthand the successes and challenges of rebuilding and maintaining local wildlife populations while reckoning with the country's colonial past was a perspective-shifting experience. Conroy also organized discussions with his former students from Namibia, who are now working in professional roles in agriculture and wildlife management. "Studying abroad in Namibia," says Conroy, "and specifically living the topics introduced in lectures and discussions, will stick with these students for years."

# FISHY BUSINESS

## COLSA scientist studies illegal fishing in developing countries and its ecological impacts

As the more than $250 million global fishing industry expands, concerns about fishing in the waters of developing countries have also grown. Little is known about how industrial fishing, both legal and illegal, impacts the local marine biodiversity and resources that many coastal communities in developing countries depend on for food security, cultural meaning and livelihoods.

**Easton White**, quantitative marine ecologist and assistant professor in the department of biological sciences, is working to change that. In collaboration with other researchers, White has been studying data from Madagascar and the Galapagos Islands. Madagascar's status as a least-developed country makes its waters particularly susceptible to exploitation by foreign fishing operations.

"It is often difficult, if not impossible, for countries with few resources to monitor fishing efforts within their own waters," says White. "This is especially true for places like Madagascar, which has a vast coastline and high marine biodiversity."

White and his colleagues are using satellites and GPS signals from fishing vessels to understand the who, when, where and how of industrial fishing off the country's coastline.

Using data from 2012 to 2020, the researchers found that 82.8 percent of all industrial fishing in Madagascar was conducted by non-Madagascar fishers, predominantly from Taiwan, France, Japan, China, Malaysia and South Korea. For more than 170,000 hours, foreign fishing vessels operated too close to shore and within marine protected areas. These results, White says, highlight the importance of studying industrial fishing efforts across the globe and the need for increased transparency and research surrounding agreements made between foreign countries and developing countries, as well as unauthorized fishing activity within these countries.

White was awarded a Charles Darwin Sustainability Fellowship in May 2021 to track industrial fishing vessels operating in the Galapagos Islands. The researchers will use satellite data to get a clear picture of legal and illegal fishing in the region.

"Understanding these fishing patterns is important, as the region is a hotspot for marine megafauna, including endangered species such as the scalloped hammerhead shark," says White. "This is not an uncommon pattern in developing countries: foreign fishing vessels are either given permission by local governments or fish illegally. In both cases, this has the potential to erode the natural resources of these countries."

# Saving Sought-After Sea Snails

## For depleted fisheries, UNH research is whelk-ome

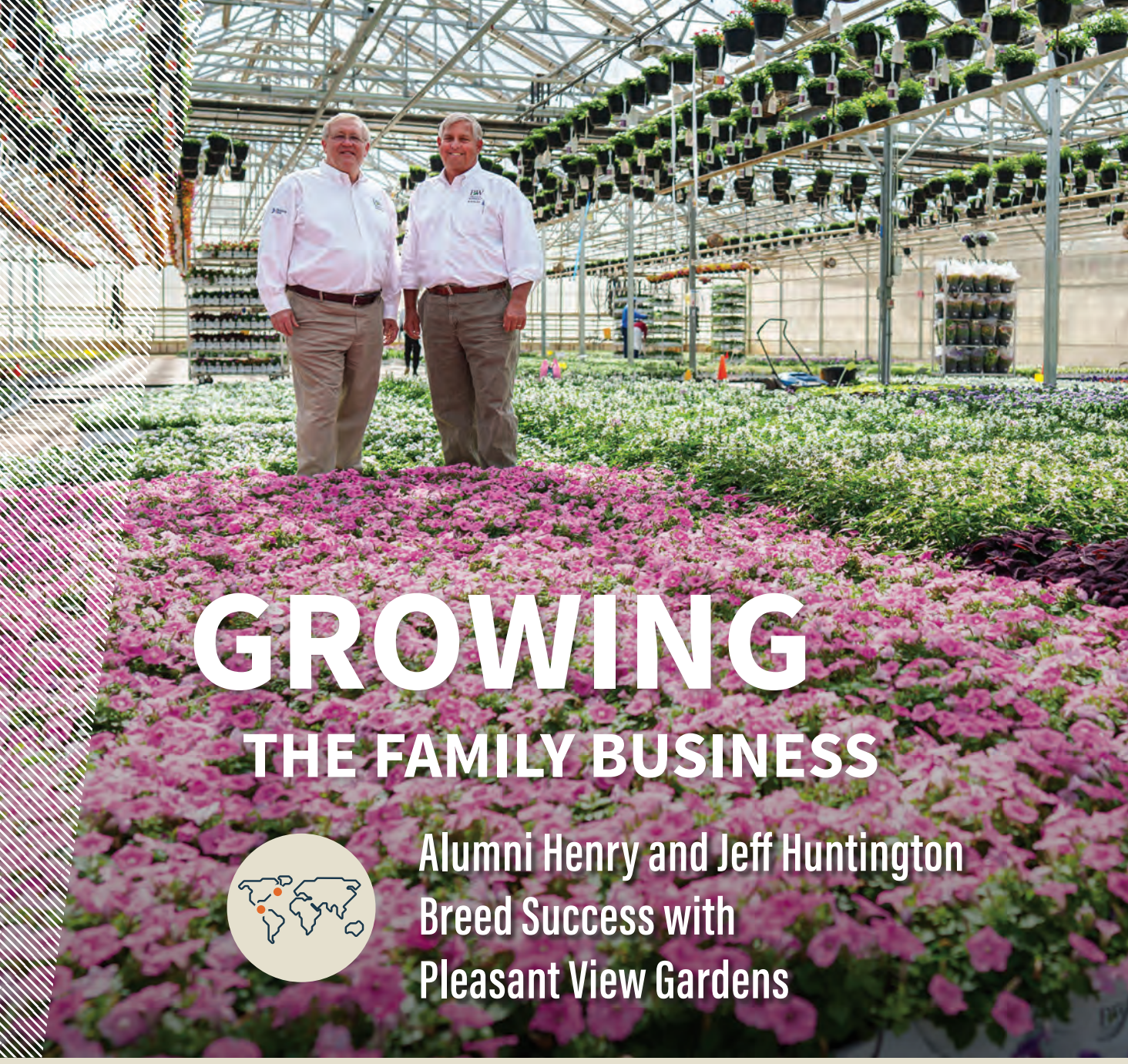
The global demand for channeled whelk — the third most popular shellfish after lobster and scallops — has diminished channeled whelk fisheries in their native habitats along the Atlantic seaboard from Massachusetts down to Florida, resulting in stricter size and trap limits and, in some states, the temporary closing of fisheries.

Research being led by **Elizabeth Fairchild**, a research associate professor in the department of biological sciences, and **Shelley Edmundson '16G**, executive director of the Martha's Vineyard Fishermen's Preservation Trust, aims to make the industry more sustainable and support the resurgence of this lucrative, high-demand species.

Together with co-principal investigators **Win Watson**, professor emeritus, and **Steve Jury '99G**, as well as **Kennedy McGrath '25, Mary Kate Munley '21, '23G, Megan Molinari '21**, Massachusetts whelk fishermen and representatives of multiple public and private partners, Fairchild and Edmundson are addressing two key industry issues: the use of traps that don't allow whelk that are too small to be caught legally to escape and the common practice of baiting whelk with chopped up horseshoe crab. The horseshoe crab is an ecologically important species that's both a key food source for migratory birds up and down the Eastern seaboard and scientifically critical — its blood is used in the production of vaccines and other medicines due to its unique toxin-identifying quality.

Working out of the UNH Coastal Marine Lab in New Castle, New Hampshire, the team has been testing modified whelk traps with escape vents and bait recipes that use little or no horseshoe crab. During the 2023 whelk fishing season in Massachusetts (April to December), they are running field trials and working with local fishermen to determine if the modified traps contain fewer undersized whelk and if the new bait recipes work as well as — or better than — the horseshoe crab bait.

*This research is supported by funding from the National Oceanic and Atmospheric Administration (NOAA) Fisheries' Saltonstall-Kennedy Program.*



# GROWING
## THE FAMILY BUSINESS

### Alumni Henry and Jeff Huntington Breed Success with Pleasant View Gardens

**Henry Huntington '80**, president and CEO of Pleasant View Gardens in Loudon, New Hampshire, has a small painting in his office depicting Rippe Brothers Market Gardens, the rural farmstand his parents, **Jonathan '50** and Eleanor (Rippe), and multiple generations of Eleanor's family owned and operated in Westport, Connecticut, in the 1960s and early 1970s. It's a colorful reminder of the Huntington family's long past in the gardening business.

The headquarters of Pleasant View Gardens is a complex of greenhouses and low-slung buildings situated on a hill. The company is a Wildcat success story: it was established in 1976 and has been operated by three generations of the Huntington family, most of them UNH alumni. The farm grows annuals, perennials and shrubs and is one of the top U.S. suppliers of young plants to greenhouse growers, garden centers and landscapers. It's also a founding partner of Proven Winners, an international consumer plant brand. Pleasant View operates greenhouses and outdoor growing space covering 30 acres in Loudon and nearby Pembroke and is a partner in other related businesses, including Ticoplant, an offshore garden stock facility in Costa Rica, and WinGen LLC, breeders of unique ornamental plants. Together,


Pleasant View Gardens and its associated businesses generate well over $75 million annually.

## Betting the Farm

Jonathan Huntington always wanted to own a dairy farm. After studying dairy farming at the UNH Thompson School of Applied Science, he managed the Rippes' family-owned farm in Westport. But he really wanted to run his own operation, one involving his sons, Henry and **Jeff '76**, who is now vice president and COO of Pleasant View Gardens. During a summer trip to New Hampshire in the mid-1970s, Jonathan discovered a small wholesale foliage business for sale.

The company is a Wildcat success story: it was established in 1976 and has been operated by three generations of the Huntington family, most of them UNH alumni.

"He told me, 'I want you to look at this greenhouse because we're going to buy it,'" says Jeff, who'd just graduated from the Thompson School with a degree in plant sciences. Buying the business was risky but made sense. "We'd always grown bedding plants or annuals for our business in Connecticut, and we owned greenhouses," Henry explains. "We were familiar with the greenhouse side of the industry." At the time, consumers were passionate about growing houseplants. "There was a plant shop on every corner, it seemed, so we saw a lot of opportunity," says Henry.

Staying nimble and taking risks have been key to the company's success. The first few years were a struggle, but the Huntingtons were willing to try new things and experiment until they found products and methods that worked. "We tried growing just about anything you could grow in a greenhouse until we found our niche," says Henry. "And that was propagating and growing our own annuals and bedding plants and selling to the independent garden center and retail market."


## Starting Proven Winners

In the wholesale garden industry, plant breeders are like rock stars: the best are in high demand. Up until the early 1990s, Pleasant View Gardens produced its own stock from plant cuttings in New Hampshire and shipped the young plants to retailers and wholesalers. The Huntingtons recognized that partnering with a breeder would boost sales because consumers were interested in the latest new plant breeds. In 1992, they created the Proven Winners brand through a partnership with two other wholesale gardening industry leaders. The idea was to develop a hardy, colorful line of annuals designed to be longer-lasting and disease-resistant (Proven Winners now also breeds shrubs and perennials). "It took off," Henry says. "Everybody was hungry for different types of plants." Today, 95 percent of Pleasant View Gardens' products are Proven Winners plants, grown from cuttings bred by a network of top international breeders.

To support Pleasant View Gardens' production of stock plants, its partner Ticoplant, a producer in Costa Rica, breeds cuttings that can't be grown in New Hampshire during the coldest months of the year. "It's 72 degrees all day, every day, in Costa Rica and they have great sun," Henry says. "It's perfect growing conditions." Ticoplant has close to 30 acres of growing space; the cuttings are shipped to Pleasant View Gardens' New Hampshire greenhouses, where they're planted into trays for growing.

## Other Innovations

The Huntingtons have continued to innovate. As consumers became more interested in growing and eating their own food, Pleasant View Gardens responded by launching Savor, a line of herb and vegetable starter plants available at garden centers. They also experimented with indoor hydroponics, launching lēf Farms in Loudon, which produces leafy greens for local restaurants, grocery stores, schools and other organizations in the Northeast. (Pleasant View Gardens sold lēf Farms in 2021.) The latest innovation isn't a plant but a compostable container to hold Proven Winners plants, produced with a corporate partner.

> "To think about what we've built here in the last 47 years is incredible."
>
> **Jeff Huntington '76**

Although they have no immediate plans to retire, Henry and Jeff have already welcomed the next generation of Huntingtons — Henry's sons, **Jon '08G** and Eric, and Jeff's sons, **Andy '02** and Ben — into the family business (Andy and Jon are co-general managers of Pleasant View Gardens). The company is a family institution that keeps evolving. "To think about what we've built here in the last 47 years is incredible," says Jeff. Henry agrees. "I'm really proud of how we've developed the different pieces of our business," he says. "We've always tried to find or grow the best to offer our customers."

# MITIGATING THREATS TO AFRICA'S CARNIVORES

In Africa, lions, leopards, cheetahs and African wild dogs — some of the continent's largest and most successful carnivores — play a critical role in maintaining the overall health of ecosystems. As Africa's apex land predators, they influence the structure of the food chain and support balance and diversity by preying on herbivores, thus promoting healthy vegetation by preventing overpopulation and overgrazing.

But **Fikirte Erda**, assistant professor in the department of natural resources and the environment, says that these iconic and charismatic carnivores, considered keystone species, face significant challenges stemming from habitat degradation and conflict with humans. Her work focuses on the latter.

According to Erda, the animals come into conflict with human communities because of perceived or real attacks on livestock or people. Her research aims to identify the ecological and social factors that influence where the carnivores live and hunt and assess the impacts of human activities on carnivore populations.

"I try to identify the causes and drivers of human-carnivore conflicts and the factors that promote coexistence, including the cultural roles — both positive and negative — these predators have in the areas we study," she says.

Working with a team of scientists from the University of Oxford and the University of Antwerp and using an ecological and spatial modeling tool she developed, Erda is currently determining the spatial distribution of large carnivores in Ethiopia. Eventually, this study will include the entire Horn of Africa.

Erda hopes this research will inform the development of innovative solutions that mitigate human-carnivore conflict and benefit both people and wildlife — such as community-based conservation programs, predator-proof livestock enclosures and education initiatives.

"By studying these species, we can identify the threats they face, such as habitat loss, poaching and conflict with humans," she says. "Ultimately, our research is essential for the conservation and long-term survival of these magnificent animals, the health of ecosystems and the sustainable coexistence of humans and carnivores."

*This work is supported by funding from the National Geographic Society, Zoo Leipzig and the Born Free Foundation.*

# Caribbean Partnership EXPANDS

UNH marine and terrestrial acousticians join the teaching, research and outreach effort in the British Virgin Islands

COLSA's teaching and research partnership with the H. Lavity Stoutt Community College (HLSCC) in Tortola, British Virgin Islands (BVI), which was spearheaded by **Gregg Moore**, coastal restoration ecologist and associate professor in the department of biological sciences, has expanded to include associated ecological restoration work by **Michelle Fournet** and **Laura Kloepper**, both assistant professors in the same department.

Fournet and Kloepper also support the work of two of Moore's students, **Creightanya Brewley '24G** and **Nia Jeffers '24G**, HLSCC alumni who joined UNH's graduate programs in fall 2021. Jeffers, who managed the HLSCC mangrove nursery, is comparing techniques to increase mangrove restoration planting success. Brewley has been conducting research to update the status of an endangered endemic frog known as the Virgin Islands coqui (*Eleutherodactylus schwartzi*) and studying the characteristics of its habitats. She hopes this work will inform conservation and management plans to protect the frogs from current and future threats.

With Fournet and Kloepper on board, the work is expanding to include acoustic studies that can help the researchers make decisions about restoration and conservation. Fournet and Moore are monitoring the soundscape of the waters around mangrove roots to detect key sea floor organisms that will help them distinguish between damaged systems, recovering systems and healthy natural systems. Kloepper, a terrestrial acoustician, is providing critical guidance in the analysis and interpretation of coqui frog recordings that Brewley is collecting in collaboration with Susan Zaluski, head of marine and maritime studies at HLSCC's Centre for Applied Marine Studies, and Cassander Titley-O'Neal, director of the BVI's National Parks Trust.

In addition, **Kim Babbitt '84**, wildlife ecologist and COLSA's associate dean of academic affairs, has been sharing her expertise on the community ecology of amphibians, and **Bonnie Brown**, professor and chair of the department of biological sciences, is leading a genomic analysis of frog DNA that seeks to corroborate acoustic data with positive identification of vocally similar taxa.

"The bioacoustic expertise Laura and Michelle are bringing to our collaborations in the BVI is creating exciting new opportunities for restoration ecology, marine biology and conservation biology," says Moore. "I'm grateful to be able to engage with such innovative and inspiring colleagues and bring their knowledge to bear on this important work."

The partnership is supporting a research exchange in the areas of coastal habitat restoration, coastal resilience and climate change, as well as student activities at the graduate and undergraduate levels on both the UNH and HLSCC campuses. It began in late 2017, when Moore got involved in the BVI's efforts to assess post-hurricane mangrove recovery following the devastation caused by back-to-back hurricanes Irma and Maria.

*The work is supported by the Darwin Initiative and the J.A. Woollam Foundation.*

# SPOTLIGHT: **NIA JEFFERS '24G**

**Nia Jeffers** (left page) is completing the last semester of her UNH marine biology master's degree in Tortola, British Virgin Islands, where she has been hired by H. Lavity Stoutt Community College's Centre for Applied Marine Studies to develop a curriculum to educate fifth-, sixth- and ninth-grade students about coastal resilience and marine biodiversity and teach them how to care for mangrove seedlings. It is part of a larger project funded by the European Union's RESEMBID Fund that will affect at least four islands in the territory.

**COLSA: How would you explain your discipline and/or research to a non-scientist?**

Jeffers: My research focus is mangrove habitat restoration and management with a focus on red mangrove restoration methods being used in the Virgin Islands.

**COLSA: Why is your research important?**

Jeffers: With every mangrove that we plant and every child who is impacted by our programs, we bring our community closer to achieving a more sustainable future. Mangroves are ecologically and culturally significant habitats that protect the Virgin Islands from the impacts of storms and erosion and help to sustain the fisheries industry. My research will inform policy for restoration and management in the coming years.

**COLSA: What do you plan to do with your degree?**

Jeffers: I plan to develop educational programs that will encourage youth in my community to pursue careers in STEM. I am committed to ensuring that young people have the tools they need to protect our islands for generations to come.

**COLSA: How does it feel to be able to do this work in the place you're from, where you grew up, where your family is?**

Jeffers: I will try to answer without getting too emotional. In 2017, I chose to take a semester off to spend time with my family. Then the hurricanes [Irma and Maria] hit. We didn't have electricity for six months. Military personnel who arrived compared the situation to a war zone. You can still see reminders of what we lost and what we still stand to lose if we don't ensure that we have natural ways of mitigating the effects of climate change. My work is not just about restoring mangroves — it's about protecting my family and my community and doing whatever we can to make sure we're better prepared in the future.

# LISTEN UP

**Michelle Fournet** and **Laura Kloepper**, assistant professors in the department of biological sciences, are both acoustic ecologists who joined COLSA in 2022. They have something else in common — fascination with and reverence for their research subjects and a deep desire to protect them.

## Laura Kloepper, A Focus on Land and Sky

Kloepper, the associate director for education at the Center for Acoustics Research and Education (CARE) at the Institute for the Study of Earth, Oceans, and Space (EOS) and leader of the Ecological Acoustics and Behavior Lab at UNH, investigates how animals use acoustics to sense and navigate their world and how acoustics can be used to monitor animal populations.

"My approach is unique in that I study animals in places where they're so densely aggregated that you can't really separate out individual vocalizations," she explains. "Imagine that you have a stadium filled with people, and everybody's yelling. You can't hear the individual yell. Instead, you're just hearing the roar of the crowd. By taking the acoustic data and processing it mathematically, we can estimate populations of animals in those groups and try to understand basic biological cycles — like when they are migrating, when they are breeding and when they are emerging from hibernation."

Much of Kloepper's research focuses on bats and their sensorimotor behavior. Through data collected at bat caves in New Mexico, she is studying how bats are sensing and moving — and how they adapt their vocalizations and flight behavior in big groups.

"If you're a bat in a big group, it should be a big challenge to use your echolocation," she says. "But they're doing it. So how is that information being transferred from one bat to the next? How is there this collective behavior while each bat can still make its own independent decision?"

Kloepper's work has also included studying hawks and bats to understand how predators select and track a target among thousands of potential prey. The findings, which were published in *Nature Communications*, revealed that hawks have adapted to hunting in a swarm — a defensive behavior that bats use to thwart attacks — by steering toward a fixed point rather than targeting an individual animal. It calls into question a common assumption that being in a large group provides protection from predators due in part to the "predator confusion effect."

Bats are a particular draw for Kloepper because they are critical to the Earth's ecosystem.

# Establishing COLSA's expertise in the fascinating field of acoustic ecology

*Laura Kloepper (left) and Michelle Fournet*

"It's been estimated that [bats] provide upwards of $30 billion in benefit to agriculture in the U.S. based on the insects they eat," she notes. "But we lack a fundamental understanding of even their basic population numbers, simply because it is so challenging to count them. By using these acoustic methods or approaches to estimate the populations, we can begin to get baseline information."

Kloepper also finds bats' behavior captivating. The first time she watched thousands of them emerge from a cave, moving like a dark river across the sky, she was astonished by behavior that seemed impossible, given the coordination needed.

"I was just loaded with so many questions about how they were doing that and how echolocation was working in that situation," she says.

Kloepper and the researchers in her lab have also developed a software program that counts bats based on thermal videos, which they've made available for the conservation community to use.

"I began to have discussions with colleagues about my work, and they said, 'We can use this to count penguins, we could use this to count frogs, we could use this to count terns.' And we just keep expanding," says Kloepper.

"If you need to conserve a species, it comes down to knowing what their population size is and how those population numbers are changing from year to year," she continues. "If we can understand what factors are driving when they are breeding, when they are migrating, we can then model how that behavior might shift as the planet continues to warm."

## Michelle Fournet, A Focus on and Under the Sea

As a marine acoustic ecologist, Fournet specializes in investigating sounds produced by underwater animals to understand how ecological processes are changing due to human activity. One of her primary research goals is assessing the resilience of bearded seals, the largest seal species in the Arctic, as conditions in their territory change.

Fournet's work has two components. The first is studying the effects of shifting sea ice on bearded seal reproductive behavior. Bearded seals are especially threatened by climate change because they depend on sea ice to rest, sleep and give birth.

"Females sit on ice floes, and males go in the water and make a long call," says Fournet. "They are basically saying, 'Come on, lady seals, get into the water and mate with me. I'm the best choice.' If there is a lot of open water and not a lot of ice, you have males competing for females on one or two ice floes. So, we're

looking at the resilience of bearded seals in the face of changing ice conditions by listening to shifts in males' calling behavior."

Less sea ice also means more open water for boats to encroach on bearded seal territories, says Fournet. The second part of her research will be studying the effect of boat-traffic noise on male seals' calling and mating behaviors.

She's partnering with Inupiat community groups in Northern Alaska to figure out strategies for bearded seal conservation and identify other climate change-related issues affecting indigenous villages.

"The villages have been there for millennia, and the people have been interacting with these seals in an extremely responsible, sustainable way," says Fournet. "If we want to ensure that the villagers get to continue their way of life, it's important to listen to them … and use the best possible science to address their challenges."

As part of her Alaskan marine mammal program, Fournet also studies humpback whale communication. With over a decade of listening to these whales, Fournet is starting to identify the function of some sounds and possibly their role in facilitating social behavior.

"Our hypothesis is that humpback whales have a unique sense of voice and that you can actually identify them by the sounds of their voices, and that this is probably how they identify each other," says Fournet. "So that's the next phase of the research: recording solitary animals so that we can link a call with a specific whale and demonstrate this sense of voice."

In addition, now that human ocean activity has returned to pre-pandemic traffic and noise levels, understanding whether reducing this noise is important for whales' ecology has again become urgent.

"Humpback whales are probably the most watched whales in the world," says Fournet. "It begs the question: With all the boats we have in the water so people can watch these whales, do they ever get a moment of silence?"

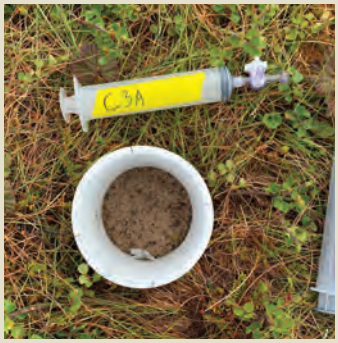
Along with her appointment in COLSA, Fournet is affiliated with CARE and is the director of the UNH Marine Bioacoustics and Behavior Lab. She also directs the nonprofit Sound Science Research Collective.

## Fortifying Strengths

Both Kloepper and Fournet aim to leverage their research to influence the management and conservation of the species they're studying. Acoustic ecology, a fascinating field in and of itself, is a critical means to that end.

For COLSA, bringing Fournet and Kloepper on adds to the already formidable teaching and research strengths of the college and, says **Anthony S. Davis**, dean of COLSA, underscores the commitment to engaged scholarship that UNH is known for.

"We have researchers working across landscapes, and bioacoustics is a natural way to expand our capacity for groundbreaking science," he says. "This seems like the right time to partner with CARE and commit to this important and emerging area of study."



# Where Permafrost Thaws

## Researchers and Students Are Working to Understand Risks

COLSA has no shortage of students who are passionate about protecting the environment, and environmental science: ecosystems major **Torin Scalora-Riley '25** *(above left)* is one of them. During his time at UNH, Scalora-Riley has found his own way to make a difference by undertaking an undergraduate research project through the National Science Foundation-funded EMergent Ecosystem Responses to ChanGE (EMERGE) Biology Integration Institute.

The research took Scalora-Riley all the way to Sweden, where he measured the methane emission rates of permafrost soil in various stages of thaw. Permafrost, which serves as a major carbon store for the planet, is being compromised by rising global temperatures. His research aims to gain a better understanding of how much methane — a harmful greenhouse gas — will be added to the atmosphere because of thawing permafrost. This work is conducted in close collaboration with research scientist **Hannah Holland-Moritz** and nested within a larger research project led by **Jessica Ernakovich**, associate professor in the department of natural resources and the environment, to analyze how microbes behave as permafrost thaws.

Data about climate feedback loops such as this supplies critical information for scientists and policymakers looking to confront threats posed by climate change. "It's a very real possibility that we could see unprecedented permafrost thaw this summer, and that can mean a lot more methane, which is much more powerful than $CO_2$," Scalora-Riley explains. Gathering more information now can help our communities better anticipate what is to come.

If there's one thing this experience has clarified for Scalora-Riley, it's that he loves to be "out in the field doing science." He adds, "I never realized what you could do as an undergrad. It's really opened my eyes to what's possible as you're beginning your scientific career."

Scalora-Riley's current career aspirations include more research and opportunities for greater engagement in environmental science communications and advocacy. He expresses certainty that, wherever he lands, this research experience "is serving as a launchpad for where I want to end up in the workforce."

# WHALE WATCHER

## David Morin ’94 has made a career of freeing whales

The place where commercial fishing and endangered species intersect is, too often, the flipper of a North Atlantic right whale or the fluke of a humpback. And for decades, **David Morin ’94** has been there to free these beasts from fishing gear.

Morin, a Manchester, New Hampshire native who studied biology at UNH, is a whale biologist with the National Oceanic and Atmospheric Administration (NOAA) Fisheries office in Gloucester, Massachusetts, where he oversees the whale disentanglement network for the Atlantic region. Getting caught in fishing gear is a leading threat to whales, whose habitat often overlaps with prime fishing grounds.

Many entanglements are minor, as whales may escape on their own with just some scrapes. “I say it’s like running through the forest at night,” says Morin. But more serious interactions can result in entangled whales perishing from exhaustion, infection or starvation. It’s been decades, Morin notes, since a highly endangered North Atlantic right whale has died from natural causes; entanglements and ship strikes have reduced that species’ number to just 330 animals.

Morin’s career as one of the East Coast’s leading whale disentanglers began at the Center for Coastal Studies in Provincetown, Massachusetts, more than 20 years ago. There, and now at NOAA, he and a team respond to distressed whales up and down the Atlantic coast, approaching these powerful bus-sized mammals in a small inflatable boat to carefully cut and pry fishing rope from their bodies. He also trains others to execute these dramatic rescues.

Morin also works in partnership with the fishing industry to design fishing gear that will limit harmful interactions with whales but remain effective at catching fish. “It’s a very complex issue. The solution is on the horizon, but there’s a lot more work to do,” he says.

Raised on Jacques Cousteau and *National Geographic,* Morin got into the “whale world” days after graduating from UNH, landing a research internship with a Gloucester whale research group. UNH fueled his passion for marine biology, and a field marine science course at Shoals Marine Lab sealed the deal. “I got a taste of it at Shoals,” he says, “and I thought, ‘That’s what I want to do.’”

Years after he started rescuing whales, Morin remains an evangelist about creature encounters. “I want people to get out and see not just whales but wildlife in the wild,” he says. “Seeing animals in nature is really fantastic.”

## FROM JAPAN: **CRITICAL TRAINING ON CRITICAL ZONES**

During summer 2023, Professor Emeritus **Bill McDowell** and Research Assistant Professor **Adam Wymore**, both in the department of natural resources and the environment, taught a course at the University of Tsukuba in Ibaraki Prefecture, Japan, about land-use impacts on the water and soils within the Critical Zone.

The Critical Zone refers to the topmost section of Earth's crust, from the lowest extent of circulating groundwater to the tops of the vegetation where water, air, soil, rock and living organisms interact. Because it's where humans have the most impact on the planet's environment and climate, this zone is important to researchers, especially those studying ecosystem dynamics and climate science.

The two-week summer course — part of the National Science Foundation-funded ABRESO project — draws international faculty to teach a global group of postdoctoral fellows, graduate students and researchers. Students visited key Critical Zone and watershed observatory sites in Japan and explored topics including soil geochemistry, ecosystem and geological processes, and biodiversity as they relate to the Critical Zone and sustainability.

This year, Wymore and McDowell were accompanied by three UNH graduate students: master's student **Alicia Dixon '24G** and doctoral candidates **Clarisse Ishimwe** and **Eric Parker.**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# A BIT ON CUCURBITS

In spring 2023, **Chris Hernandez**, assistant professor in the department of agriculture, nutrition, and food systems, received $50,000 from the UNH Innovation Fund to support the expansion of commercialization opportunities for UNH's cucurbit breeding program. Hernandez aims to develop new varieties of squash, pumpkins and melons that have improved characteristics, such as increased market yield, disease resistance and nutritional quality. In addition, he will collect genetic data on key UNH breeding lines using DNA sequencing at UNH's Hubbard Center for Genome Studies to preserve a vast collection of seeds and historical genetic information. He hopes to ultimately make breeding lines available for license to farmers in New Hampshire and worldwide.

Hernandez is continuing the long-standing work of **Brent Loy**, professor emeritus, whose research resulted in more than 100 new varieties of squash, pumpkins, gourds and melons sold in seed catalogs around the world. Loy is responsible for more than 50 exclusive licenses held by UNH. Royalties have generated more than $2 million for the university since the commercialization of these varieties began.

Cucurbit breeding was launched at UNH by **A.F. Yeager** and **Elwyn Meader** in the 1940s, beginning what is now the longest continuous squash and pumpkin breeding program in North America.