

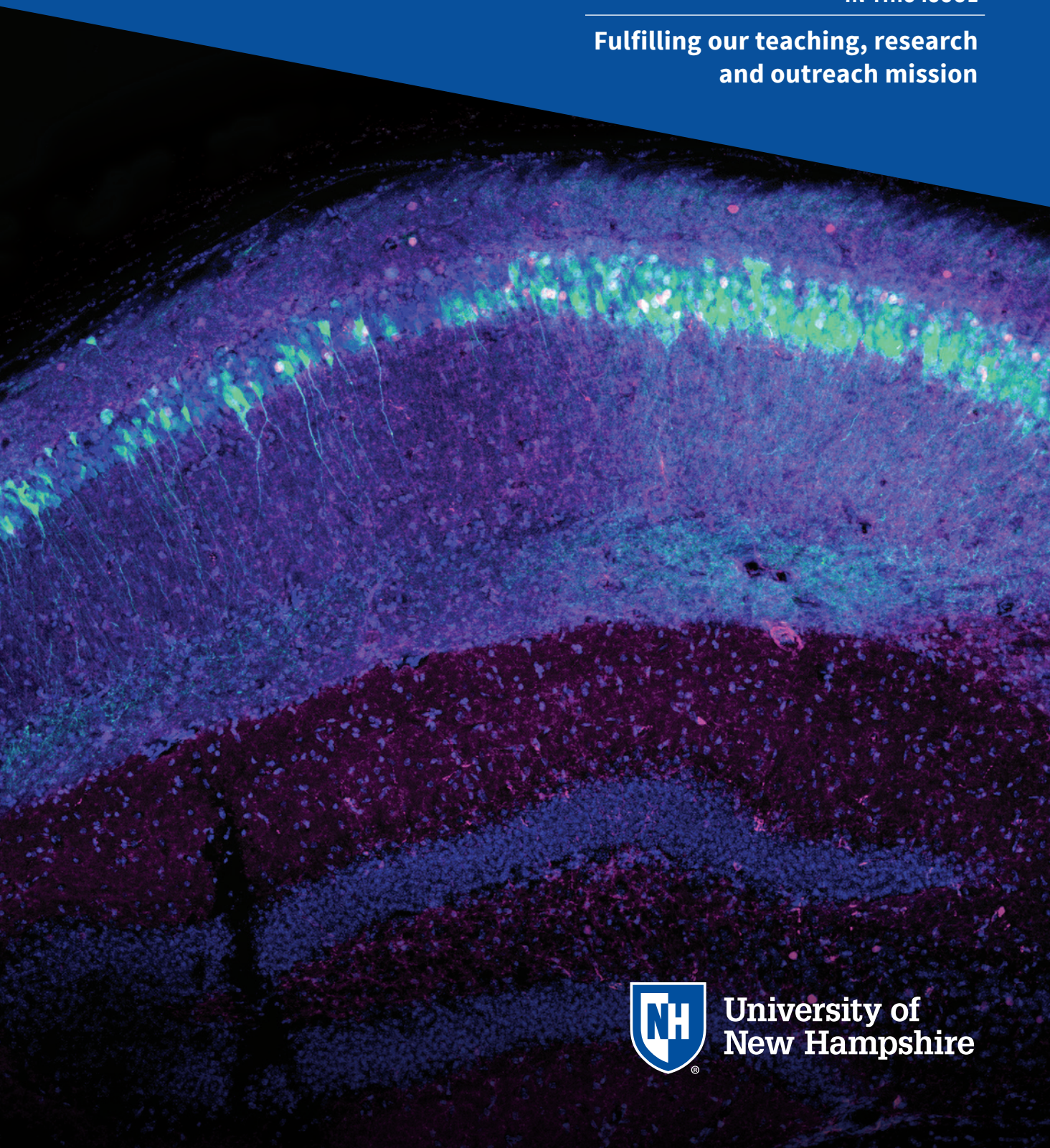
Spring 2025

# THRIVE

NEWS FROM THE COLLEGE OF LIFE SCIENCES AND AGRICULTURE

IN THIS ISSUE

Fulfilling our teaching, research  
and outreach mission



University of  
New Hampshire



# SOMETHING COMPLETELY DIFFERENT

Did you know that sweetpotatoes (growers and scientists use one word, not two) are not related to potatoes? Even though both of them originated in Central and South America, the potato is from the nightshade family and the sweetpotato belongs to the morning glory family. Also, sweetpotatoes are root vegetables; potatoes are tubers. Sweetpotatoes aren't related to yams — which are also tubers — either.

The National Sweetpotato Collaborators adopted the one-word spelling in 1989 to help differentiate sweetpotatoes from potatoes and dispel the idea that “sweet” was simply an adjective describing a type of potato. And in 2022, the North Carolina Sweetpotato Commission launched a petition to make the one-word spelling official in dictionaries and style guides. (Spoiler alert: The effort hasn't been successful yet; AP Style still insists it's two words.)

Happily, the argument over semantics isn't hindering the sweetpotato research at UNH, which has led directly to more sweetpotato growers in New England. You can read more on page 19 about Professor **Becky Sideman's** work, which has been supported by many graduate and undergraduate students over the years.





**ON THE COVER**

*A confocal image at 20x magnification of a mouse hippocampus, a part of the brain involved in learning and memory formation. The green, pink and blue stains for different proteins markers allow researchers to more easily observe activity.*

## LIVING OUR COMMITMENT TO COMMUNITY

The stories in this issue of THRIVE remind us that COLSA remains steadfast in our mission to improve lives and livelihoods in New Hampshire, the region and beyond. Our faculty, staff and students continue to advance meaningful research, foster innovation and contribute to the betterment of society through discovery, education and outreach.

For example, the research of Professor Becky Sideman and her team has significantly increased sweetpotato production in northern New England. Since 2006, when she started working with sweetpotatoes, annual yield in New England has increased from roughly 79,200 to 3,623,400 pounds. In aquaponics, Professor Bonnie Brown is leading an effort at UNH to create resilient and sustainable systems specific to our region that integrate plant and fish growth. This research will lay the foundation for more sustainable food production in the Northeast.

Our researchers are also continuing to shape and grow our understanding of the natural world. Research Laboratory Supervisor Mel Knorr and Professor Serita Frey recently found that the combined effects of warming and increased nitrogen may have less of an impact on soil carbon loss in Northeastern forests than previously thought, offering hope for better forest management in a changing climate.

We're also forging new partnerships. Through a collaboration with Lonza, COLSA students are working to solve real-world biologics manufacturing challenges. Additionally, new neuroscience and behavior graduate programs, developed with the College of Liberal Arts and the College of Health and Human Services, will position students for success in this critical field.

As you know, I am proud to work with a group of researchers, educators and students who have such a remarkable commitment to creating, acquiring and disseminating knowledge that improves the world. It is my sincere hope that in reading our stories, you will share my gratitude for being part of this community. Thank you for taking the time to read THRIVE and for supporting our work and our mission.

Warm regards,

A handwritten signature in black ink, appearing to read 'Anthony S. Davis'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

**ANTHONY S. DAVIS**

Dean, UNH College of Life Sciences and Agriculture

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**In 2024, more than 500 donors contributed to raising \$123,000 for the college, which supports scholarships, research and hands-on learning essential to the COLSA experience.**

**[unh.edu/603](https://unh.edu/603)**





## MANAGING COYOTES

### UNH study reveals surprising insights into their thriving population

Once a rare sight in the Northeastern United States, coyotes have become a common presence across New Hampshire. These adaptable predators are now in every county, thriving in forests, farmlands and even suburban areas. However, the reasons for their adaptability have not been extensively studied.

**Rem Moll**, an assistant professor in the department of natural resources and the environment, and Roland Kays, a research professor in wildlife and conservation at North Carolina State University, co-led a study that revealed surprising insights into the management of these resilient predators. Their research, published in the journal *Ecography*, focused on how hunting by humans and larger predators has affected coyote populations in various habitats.

Using data from more than 4,500 camera traps across the United States during a three-year period, the team found that hunting by humans, often intended to control coyote numbers, actually seemed to lead to population increases. This likely occurred because younger coyote populations with higher reproduction and immigration rates filled the gaps left by those that had been killed, resulting in unexpected population growth.

The study also shed light on the role of larger predators, such as black bears and pumas. In forested areas, both black bears and pumas reduced coyote numbers. In more urbanized landscapes around cities, the researchers found that pumas alone reduced coyote populations.

“Larger carnivores are essential in maintaining balance within ecosystems, and their recovery may offer a more effective approach to regulating coyote populations than direct human hunting,” said Moll. 🐾

*This study was supported by the New Hampshire Agricultural Experiment Station and the National Science Foundation.*

## TARGETING INFLAMMATION IN CANCER THERAPY

**Sherine Elsawa**, an associate professor in the department of molecular, cellular, and biomedical sciences, is investigating how chronic inflammation contributes to the development of cancer and its resistance to treatment. Inflammation is known to create an environment that helps cancer cells grow, survive and evade the immune system. This is especially true for Waldenström macroglobulinemia, which is the focus of Elsawa’s research. In this rare type of B-cell lymphoma, inflammation not only drives tumor growth but also makes the cancer more difficult to treat.

At the heart of Elsawa’s work are glioma-associated oncogene homolog proteins, which control gene activity involved in inflammation and play a crucial role in directing how cancer cells behave and interact with their surroundings, influencing tumor growth and response to treatment. By studying these proteins, she is trying to understand how this process works.

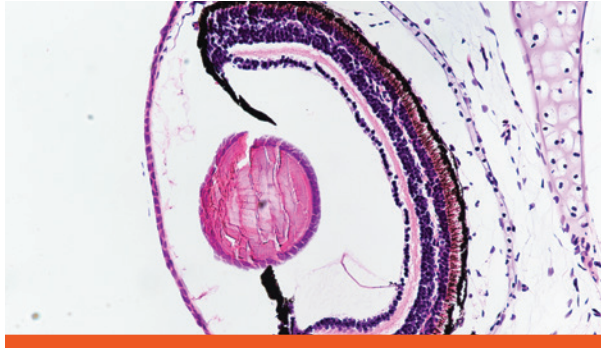
“Understanding how inflammation drives cancer progression is crucial,” Elsawa says. “By targeting the proteins that regulate these inflammatory processes, we can begin to explore new therapeutic strategies that aim to not only destroy cancer cells but also alter the environment that allows them to thrive.” 🐾



## COULD LESSONS FROM SALAMANDERS TRANSFORM THE FUTURE OF HEALING?

The promise of regenerative medicine lies in its potential to restore tissues and heal injuries once thought untreatable. Scientists are now looking to nature for solutions, and few organisms offer more insight than salamanders.

**Konstantinos Sousounis**, an assistant professor in



the department of molecular, cellular, and biomedical sciences, is leading research into how newts, specifically the Iberian ribbed newt, regenerate eye lenses. He hopes that what he learns will further human therapies.

“Salamanders can regenerate pretty much anything — from limbs to parts of the brain and heart. We want to understand why and how they do this — and what makes them different from other vertebrates, including humans,” says Sousounis. “Our hope is to learn how we might induce human tissues to regenerate in the same way that salamanders do, particularly in areas like the retina and lens.” Ultimately, the goal is to apply Sousounis’s findings to human medicine.

Sousounis’s research is paving the way for future regenerative therapies, offering hope that one day humans could heal their own tissues just as remarkably as salamanders do. ▀

## A SUSTAINABLE SOLUTION FOR SALMON FARMING

Salmon farming — an industry answer to the growing global demand for salmon — faces obstacles that threaten its sustainability and increase its negative environmental impact. One of them is the fishmeal used in salmon feed.

**Elizabeth Fairchild**, research associate professor, and **Karolina Kwasek**, assistant professor, both in the department of biological sciences, believe they have a solution. They are investigating how sea kelp can

provide a sustainable and locally sourced alternative to fishmeal. Their research, conducted in partnership with the University of Maine, could have important environmental and economic benefits for New England’s aquaculture industry, including the potential to revolutionize salmon farming — resulting in healthier fish and healthier oceans.

Atlantic salmon farming still relies largely on feed made from small schooling fishes. However, fishmeal is

both environmentally unsustainable and costly, making up nearly 70 percent of the industry’s production expenses.

Fairchild says that cost-effective sea kelp has antioxidant and anti-inflammatory properties that could improve the health of farmed salmon and contribute to healthier oceans by absorbing excess nutrients that would otherwise harm marine ecosystems. ▀

*This study is funded by the USDA Northeastern Regional Aquaculture Center.*



# Neuroscience and Behavior Program Expands to Include Graduate Degrees

COLSA, in cooperation with the College of Liberal Arts (COLA) and the College of Health and Human Services (CHHS), is adding to the growing body of neuroscience research and teaching at UNH with a new neuroscience and behavior (NSB) accelerated master's degree program and a doctoral program. The programs, overseen initially by **Xuanmao Chen**, associate professor in the department of molecular, cellular, and biomedical sciences, will leverage the expertise of the many UNH faculty who are actively studying neuroscience and behavior, combining disease-focused research with extensive research on behavior. This type of integration is unique among NSB graduate programs in the region and will offer students a depth and breadth in neuroscience that will enhance their success and workforce marketability.

Neuroscience and behavior is a relatively new field of study at UNH but has experienced rapid growth, thanks significantly to the vision and generosity of **Peggy '72** and **Bob Cole**. In 2011, they established the Cole Interdisciplinary Faculty Research Fund for Neuroscience to provide seed funding for faculty members conducting research in neuroscience and behavior, a joint initiative of COLA and COLSA.

The Coles' investment laid the groundwork for the establishment of two neuroscience and behavior undergraduate Bachelor of Science degrees, one in COLA and one in COLSA, in 2014.

Spurred by the success of the research and teaching their endowment has supported, the Coles increased the size of their gift in 2018. Since then, the Cole Interdisciplinary Faculty Research Fund for Neuroscience has supported two projects — one based in COLA and one in COLSA — every year.

“The new NSB graduate program will allow faculty from multiple colleges to recruit talented graduate students who identify uniquely with neuroscience and behavior for their careers,” says **Bonnie Brown**, professor and chair of the department of biological sciences. “It will also provide a pathway for existing undergraduates to transition to an accelerated graduate degree, expand opportunities for faculty collaborations across UNH and lead to new extramural research support.”





## KRISZTINA VARGA JOINS NSF AS PROGRAM DIRECTOR TO ADVANCE RESOURCES FOR BIOLOGICAL RESEARCH

**Krisztina Varga**, an associate professor in the department of molecular, cellular, and biomedical sciences at UNH, has been appointed as a program director in the U.S. National Science Foundation's (NSF) Directorate for Biological Sciences, Division of Biological Infrastructure. In this role she will support the division's mission to build resources and infrastructure that advance essential biological research.

Varga's new role began in November 2024 and is part of the NSF rotator program, which invites researchers nationwide to guide NSF investments. This program allows scientists like Varga to make funding decisions, set research priorities and bring fresh perspectives while staying connected to their institutions.

"I am very excited to have the opportunity to support NSF's mission to advance basic science," Varga says. "Contributing to the improvement of infrastructure in biology is something I am deeply passionate about."

At UNH, Varga's research includes studying antifreeze proteins, which prevent the growth of ice crystals and have applications in cryopreservation and agriculture; chiral nanoparticles, which could improve bioimaging; and a bacterial hub protein, which organizes other proteins in a cell and regulates their activity. Her expertise will help NSF advance tools and resources that support discoveries across the biological sciences, benefiting researchers nationwide. ▀



## WILFRED WOLLHEIM ACCEPTS FULBRIGHT TO CONDUCT RESEARCH ABROAD

**Wilfred Wollheim**, professor of natural resources and the environment and co-director of the Water Systems Analysis Group, accepted a Fulbright U.S. Scholar Program award for the 2024–2025 academic year from the U.S. Department of State and the Fulbright Foreign Scholarship Board, granting him the opportunity to complete research internationally.

Wollheim is visiting the Spanish National Research Council's Blanes Centre for Advanced Studies to conduct research for a project titled "River ecosystem capacity to improve water quality in Spain." He is working with researchers at the Blanes Centre to develop, test and apply generalizable approaches for understanding the ability of river systems to improve water quality. The hope is that findings "will allow environmental managers to prioritize where and what types of watershed mitigation activities should occur to improve water quality," he notes in the project abstract.

The Fulbright is a prestigious recognition. Notable recipients include 62 Nobel Prize laureates, 89 Pulitzer Prize winners, 80 MacArthur Fellows, 41 heads of state or government and thousands of leaders across the private, public and nonprofit sectors.

**Heidi Asbjornsen**, professor of natural resources and the environment and program coordinator for forestry, was also offered a Fulbright award, but was unable to accept. ▀



# Strengthening Early Childhood Nutrition Pathways in the Granite State

For **Nooreem Mena**, an assistant professor in the department of agriculture, nutrition, and food systems and a registered dietitian, a desire to understand the impact of nutrition on children's health began as a personal interest and firmly took root during her graduate studies. Driven by a fascination with how family food practices shape lifelong habits, Mena decided to focus her research career on the critical early years of childhood nutrition.

"We all have our own unique relationships with food," says Mena. "A lot of those relationships are formed during the early childhood years. When I began studying nutrition, I was fascinated by how much our early experiences influence what we eat and how we think about food later in life."

"For many parents, feeding practices are influenced by their own childhood memories, whether positive or negative, and that cycle often repeats across generations."

This concept propels Mena's work to expand healthy eating opportunities for young children in New Hampshire. Her current research focuses on two national programs: Farm to Preschool and the Child and Adult Care Food Program (CACFP). Farm to Preschool is a national initiative that is part of the broader Farm to School movement. Farm to Preschool focuses specifically on early care and education (ECE) settings, such as preschools, Head Start programs and daycare centers, increasing access to nutritious, locally sourced foods through activities like gardening, food-based education and local food procurement. CACFP is a federal nutrition program that supports ECE settings by reimbursing the cost of serving balanced, healthy meals. Together, these programs can help create a strong nutrition foundation for young children across the country.

In New Hampshire, however, Farm to Preschool and CACFP are still developing, with unique challenges

arising from rural logistics, workforce shortages and varied resources across the state's ECE settings. To address these challenges, Mena's research explores statewide participation in both initiatives, analyzing factors that encourage or prevent ECE settings from fully implementing them.

"One of the challenges here in New Hampshire is the low participation rate," she explains. "We're hoping that through surveys and focus groups we can start getting a bigger picture of the barriers to participation."

Mena's work will assess participation in these programs across different settings and identify the support systems needed for widespread adoption. In this effort, she is collaborating with partners at UNH Extension to host family nutrition events and gather insights from both parents and ECE providers to understand what works best within local communities.



## COLLABORATING FOR SUSTAINABLE AQUAPONICS IN THE NORTHEAST

**Bonnie Brown**, professor in the department of biological sciences, is co-leading a multistate collaboration with Hanping Wang of Ohio State University and Victory Aquaponics in Londonderry, New Hampshire, to develop aquaponics systems tailored to the Northeast and lay the groundwork for a more resilient and sustainable food system. Aquaponics combines fish farming with plant cultivation in water, offering an efficient and sustainable way to boost food production while conserving water and other resources.

Brown and her team are also studying the role of microbes that help break down fish waste and convert it into nutrients that plants can absorb, which keeps the water clean for the fish while supporting plant growth. By optimizing the microbes that promote nutrient cycling, the team aims to improve the overall efficiency of aquaponics systems.

This project spans multiple locations, including New Hampshire, Ohio and West Virginia, where researchers are testing different combinations of fish and plants to determine the best matches for each region's climate.

“By bringing together experts in multiple disciplines, we're not only optimizing aquaponics systems for the Northeast but also creating models that could be transformative for sustainable food production,” says Brown. 🍷

**“For many parents, feeding practices are influenced by their own childhood memories, whether positive or negative, and that cycle often repeats across generations.”**

— **Nooreem Mena**

Ultimately, Mena envisions this research as a steppingstone to a more connected and supportive network of early childhood programs that prioritize nutrition and healthy eating across the Granite State. By gathering data and building a clearer picture of what's possible, she hopes to help establish a statewide Farm to Preschool framework that brings local foods, nutrition education and family engagement into every childcare setting.

“When parents are engaged, they help reinforce positive changes in early care and education programs,” says Mena. 🍷





# Brain Breakthrough

## New research sheds light on how neurons in your brain play a major role in cognition and mental health

It probably comes as no surprise that the brain is considered the most complex organ in the body.

**Xuanmao Chen**, associate professor in the department of molecular, cellular, and biomedical sciences, and his team are working to unravel a specific and important neurological complexity: how the activity hierarchy among neurons in the cortex is formed, and how eliminating the hierarchy — an effect of certain drugs, like ketamine — impacts learning and mental stability.

The human brain contains around 100 billion neurons. Neurons send and receive signals, and their interactions determine how we learn, how we move, what we think and feel and how we experience the world around us. About 10 percent of the neurons in the brain's cortex are active and,

together with the less active, or “silent” neurons, they form what scientists call the activity hierarchy.

What isn't yet understood is what controls the hierarchy and how it might be manipulated to develop better and safer treatments for disorders and illnesses originating in the brain. Mao and his team believe that the N-methyl-D-aspartate (NMDA) receptors may be part of the answer.

The team found that when NMDA receptors in mice were blocked, the neuron hierarchy disappeared: The active neurons became less active, resulting in a more uniform level of activity among all neurons. The data suggest that this likely leads to a cessation of the ability to learn and an increased risk of disassociation — the inability to process

information — and psychosis. A neural network simulation model developed by **Mark Lyon**, associate professor of applied mathematics in the UNH College of Engineering and Physical Sciences, confirmed this initial finding.

Chen's research sheds light on concerns that have arisen around the use of ketamine, which works by blocking the NMDA receptors in the brain. In the last three decades, ketamine — FDA approved since the 1970s only for use as an anesthetic — has gained increasing acceptance as a therapy for treatment-resistant depression and other mood disorders.

"We know that ketamine can be used as an anesthetic and a fast-acting antidepressant, but it has many adverse effects," says Chen. "Our research indicates that ketamine causes psychosis, disassociation and learning impairment by blocking NMDA receptors, a gatekeeper for the hierarchy. Understanding how this works may lead to better treatments: still using ketamine, but using it in a way that doesn't put the patient at risk, or utilizing the research to develop alternatives to ketamine to manipulate the hierarchy in the brain."

The team working with Chen on this research includes **Yuxin Zhou '23G**, **Jenn Wang '27G**, **Jordan Torpey '22**, **'23G**, research scientist **Liyan Qiu**, undergraduates **Jemma Wixson '24** and **Jacob Dumais '25**, and Lyon.

Recently, Chen's Academic Research Enhancement Award, which supports this research, was renewed by the National Institutes of Health. The grant will give him and his team the resources they need to develop and establish fundamental concepts of how neural activity hierarchy is formed and controlled.

Chen's laboratory has two major research focuses: hippocampal memory formation and primary cilia, which are tiny antenna-like projections on the surfaces of cells that regulate a variety of physiological functions, including sensation, cognition and development.

"Elucidating the mechanisms underlying learning and memory formation is needed not only to understand how we acquire and retain experiences and knowledge, but also to develop mechanism-based therapies to treat cognitive dysfunction-related disorders, including dementia, post-traumatic stress disorder, intellectual disability, depression, schizophrenia and autism," Chen says. ▀

**Chen's research sheds light on concerns that have arisen around the use of ketamine, which works by blocking the NMDA receptors in the brain.**



# A Culture of Safety

With donor support, COLSA is offering training to build first aid skills and peace of mind for those in the field

“There was so much blood.”

**Laura Kloeppe**r, associate professor in the department of biological sciences, had just reached the top of Mt. Washington and was queuing up to take a photo at the summit sign when she noticed a fellow hiker on the ground, bleeding heavily from a head wound. The people nearby seemed unsure how to help.

“I ran over to her, and I said, ‘Hi, my name is Laura. I’m certified in wilderness first aid. Do I have your permission to help you?’” Kloeppe says. “I took out my pack with all my supplies and went right to work.”

Kloeppe, along with 18 other faculty, staff and students from COLSA, became certified in wilderness first aid in May 2024 after taking the two-day training course offered by the SOLO School, which describes itself as the oldest and most innovative wilderness medical school in the United States.

**Brent Bell '87, '05G**, associate professor in the College of Health and Human Services, and **Ian Hanley**, a doctoral student in experimental education at UNH, were the instructors.



The college was able to make the course available to the COLSA community thanks to the generosity of donors who gave to the dean's fund. Offering the wilderness first aid course to faculty, staff and students in the college is part of a broader effort championed by the dean's office to enhance safety skill-building that began during the pandemic.

"It seemed like a good time to reflect on safety at all levels," says **Laurie Westover**, COLSA's facilities and operations manager. "We work at the edge of so many complex and potentially dangerous situations, from lab to field — issues ranging from health and wellness to infrastructure and weather. Being sure that we have a way to daylight potential hazards and then take steps to mitigate risks and increase preparedness is an investment in our people and the broader community."

The 16-hour course covered response and assessment, musculoskeletal injuries, environmental emergencies, survival skills, soft-tissue injuries and medical emergencies.

Many COLSA researchers, including Kloepper, conduct fieldwork that often takes them to rugged, remote places where cell service is spotty or nonexistent. For scientists in those situations, even basic first aid training can make a critical difference in the safety of the team.

"In my opinion, the best thing the course does is make people aware of what can go wrong before they go out, and it gets people to think more about how to be prepared," says Bell.

"A lot of basic first aid training is predicated on being able to call 911 and get someone to a hospital quickly. What happens in the wilderness totally changes that because you might not get help for hours or, in some cases, days. Then it's up to you to make a diagnosis and start treating."

Even before she had a reason to apply what she learned, Kloepper was a big believer in the importance of such training.

"This course was invaluable to my research group," she says. "It allowed us to also think of some 'what if' scenarios, and we all agree that we will continue to discuss safety as we move forward with new projects. I view it as fundamental training that any scientist who's doing fieldwork should have."

Since spring 2023 the college has offered CPR/standard first aid training to faculty, staff and graduate students, and plans to offer annual training courses to make these critical opportunities broadly accessible across the COLSA community.

As for the injured woman on Mt. Washington? After receiving care from Kloepper and the EMTs, she insisted on hiking back down the mountain. 🇺🇸





## RESEARCH REVEALS CLIMATE CHANGE IMPACT ON FORESTS MAY BE LOWER THAN EXPECTED

Plants can help stabilize soil carbon levels despite rising temperatures

New England's forests confront multiple environmental challenges, including rising temperatures due to climate change and increased atmospheric nitrogen deposits caused by the burning of fossil fuels. Scientists have previously studied the impacts of each independently, but researchers at the University of New Hampshire looked for the first time at the effects of the two together. They found that when warmer temperatures and increased nitrogen levels were combined in soil, carbon storage remained stable due to increased belowground plant input from roots. This finding challenges earlier studies and suggests that the loss of soil carbon in Northeastern forests impacted by climate change may be lower than previously predicted.


“What is most exciting about this study is that it's one of the longest-running experiments to look at two global change pressures instead of just focusing on one,” says **Melissa Knorr**, a lab research supervisor in UNH's College of Life Sciences and Agriculture and one of the lead authors. “This is particularly important to study in the Northeast, a region that has experienced greater nitrogen deposition historically and is now warming faster than other parts of the country.”

The study, published in *Nature Ecology & Evolution*, outlines how Knorr and fellow lead author **Serita Frey**, a

professor in the department of natural resources and the environment, used data from a 16-year study at the Harvard Forest Long-Term Ecological Research site in Massachusetts to examine this carbon dynamic. Previous work at the Harvard Forest site documented that soil warming alone leads to significant carbon loss in forests, whereas long-term soil nitrogen enrichment results in carbon buildup.

Over the past century, New England's average temperature has risen by 1.7 degrees Fahrenheit. While research shows that rates of nitrogen deposition are declining in the region, they are still five to six times higher than pre-industrial levels. This excess nitrogen, deposited onto ecosystems through rain and snowfall, can harm forests by damaging plant health and acidifying waterways.

The researchers say the findings of this study highlight the importance of plant-soil interactions in forest ecosystems and how these processes could be key to managing forests and ensuring that they continue to absorb CO<sub>2</sub> and reduce its concentration in the atmosphere.

Co-authors include **Alexandra Contosta**, **Eric Morrison** and **Thomas Muratore** of UNH; Mark Anthony, University of Vienna; Kevin Geyer, Allegheny College; and Luliana Stoica and Myrna Simpson, University of Toronto Scarborough. 



# *Alumna and Advocate*

An inspirational experience as an undergrad led Samantha Furstein toward success — and underlies her longtime support of the college

**Samantha Furstein '92** has a wealth of fond UNH memories — like driving out to Rye Beach with friends, where they'd sit on the rocks and listen to the waves, and trips to Karl's for late-night snacks. But her favorite memories take her back to the Jackson Estuarine Laboratory, where she spent summers volunteering as part of Research Associate Professor **Steven Jones's** oyster research.

"It was the most transformational opportunity I had at UNH," Furstein says. "I loved working in the lab and being on the coast. It taught me everything a person in the sciences needed to know how to do."

Furstein believes those life-changing opportunities are the heart of the College of Life Sciences and Agriculture (COLSA). Though she lives in California now and rarely takes a leisurely drive along Route 1A, she remains committed to COLSA through her work as chair of the college's development board. She hopes to share the joy she experienced in her summers at the Jackson Lab with future generations of Wildcats.

"There are amazing opportunities at UNH, and the question is, 'how do we let current and prospective students know about what UNH has to offer?'" she says.

Furstein's path to the Granite State began before she was born. Her grandfather was stationed on the New Hampshire coast during World War II and knew about UNH. When she started looking at colleges, he had UNH send her a brochure. Reading about the university's excellent animal science program and seeing its beautiful campus made her choice easy.

During her first year, Furstein fell in love with the region. The rocky coast, brackish air and roaring waves called to her. Though she returned home to Goshen, New York for the summer before her second year, she vowed to find work that would keep her on the Seacoast in subsequent summers.

Enter Jones and his oyster research at the Jackson Lab. Furstein volunteered in the lab for the next three years. During her senior year, Jones encouraged her to take part in the Undergraduate Research Opportunities Program (UROP). She wrote a proposal and received \$350 for materials to develop a test for detecting *Vibrio vulnificus*, a bacterial pathogen found in the waters and the oysters of Great Bay.

The pathogen, which can cause illness in humans, can be detected easily through a culture when the waters are warm, but not during the winter months. Furstein wondered: Did *Vibrio vulnificus* simply die off in the winter, or did it go dormant? She worked on creating a polymerase chain reaction (PCR) test to find out. PCR tests are more sensitive than cultures because they amplify small amounts of genetic material into large quantities that are easy to detect.

That experience was especially relevant when Furstein began her career at Roche Molecular Systems in New Jersey in 1992. The company was in the early stages of developing PCR test kits for diseases like the hepatitis C virus and tuberculosis.

"Being exposed to writing a grant, conducting research and performing experiments carried over into my professional career," she says. "I was able to draw on that experience once I entered the workforce."

After many years at Roche, she moved on to a small biotech startup in Texas. She continued to build her professional skills, met her husband, and started a family. But UNH remained on her mind, and she became a regular donor.

"I gave a little, year after year, and as the years went on, I increased my donations," Furstein says. When she received a copy of THRIVE and read about the research efforts and programs in COLSA, she "was really impressed with how UNH and the college had grown throughout the years. It really blew me away, and I felt great about supporting COLSA."

As Furstein reconnected with COLSA, her own daughters were entering college. During a phone call with Dean **Anthony S. Davis**, she asked how COLSA was raising awareness about its programs among current and incoming students. "I was in the throes of college searching with my kids, and I was asking all these probing questions. Dean Davis asked if I'd be interested in joining the board," she says. "The timing was right. I had more time to give with the kids heading off to college, and I was already a donor in support of these fantastic programs. So why not become more connected and learn more about COLSA?"

"Being involved has an impact. Whether you're supporting COLSA or another college, getting involved lets you meet new people and see what's happening on campus, and provides an insider view on UNH programs."

Furstein sees herself as an advocate for the college. She wants students, alumni and other donors to know about the innovative research that COLSA faculty and students are conducting. "By growing this board and bringing everyone together from across departments, we'll be able to assist Dean Davis in achieving his goals," she says, which include funding research and major initiatives like the recently completed Spaulding Hall renovation. "Being involved has an impact. Whether you're supporting COLSA or another college, getting involved

lets you meet new people and see what's happening on campus, and provides an insider view on UNH programs."

Furstein and other board members traveled with Davis to Italy in the spring of 2024 to meet with students studying there as part of the UNH-in-Italy program. The experience reminded Furstein of her own days as a student researcher along the New Hampshire coast.

"[The students] were amazing to talk to and very engaging — they knew exactly where they were going in their academic careers," she says, "which means COLSA is doing something good."

Most recently, Furstein worked with the college to establish the Furstein Family Experiential Learning Fund, which will help support COLSA students with experiences outside the classroom. ■



# Career Catalyst

**A new partnership between UNH and Lonza, one of the largest pharmaceutical manufacturers in the world, is bringing exciting workforce development projects and potentially new internship opportunities to students in COLSA and the UNH College of Engineering and Physical Sciences.**

At the start of the spring 2025 semester, COLSA students began working on several independent research projects under the guidance of UNH faculty co-mentors and scientists at Lonza's Portsmouth, New Hampshire, facility. These Lonza-inspired projects respond directly to the company's needs, focusing on improving processes and workflows at different stages in the manufacture of biologics — a class of medicines produced by living organisms.

"Lonza faces technical issues, in terms of optimizing the growth of cells or the purification of proteins, that are suitable for students to work on — and [the partnership] gives the students a real problem to solve," says **Rick Cote**, professor of biochemistry and molecular


biology and the director of UNH's Center of Integrated Biomedical and Bioengineering Research. "This is something students will be able to put on their resumes when they graduate — they'll have the experience to say they were involved in process improvement in a manufacturing environment."

The projects will allow the college to accommodate more students who want to be engaged in applied research and provide them with a better understanding of industrial research and process development. They could also lead to summer internships at Lonza for the students involved.

Over the years, many COLSA graduates have found employment with Lonza, and the company has

long offered internships for students and research collaborations with faculty. Lonza has also made many generous donations to COLSA, including bioreactors, centrifuges, water baths, balances and other lab equipment, as well as glassware and a variety of laboratory supplies.

This new collaboration is an exciting addition to the relationship between the university and the global healthcare manufacturer.

"These initial student research projects are a pilot of something that will hopefully expand over time," says Cote. "Lonza has always looked to UNH for positions that they need to fill, and I think they're excited about enhancing the biotech workforce training pipeline of skilled UNH graduates." 



UNH sweetpotato trials  
help New England growers thrive

# ROOTED IN RESEARCH

The sweetpotato, a crop traditionally associated with the South, is making waves in New England, thanks to the collaborative efforts of researchers and local farmers. Over 15 years ago **Becky Sideman**, a professor and chair in the department of agriculture, nutrition, and food systems, embarked on a journey to determine whether sweetpotatoes could grow in northern climates. Inspired by a desire to help farmers in the region diversify their crops and tap into a growing market, Sideman set out to see if this southern staple could do well in New England's shorter growing seasons.

"We started out not knowing if sweetpotatoes could even grow here, but we've shown that not only can they grow — they can thrive," says Sideman. "It's exciting to see them become a viable crop for so many farmers in the region."

Sideman's early trials were groundbreaking. Growing varieties like Covington and Beauregard, she showed that sweetpotatoes could yield abundant harvests, offering farmers a new crop with strong market potential. That initial study paved the way for a growing sweetpotato industry, particularly in northern New England. According U.S. Department of Agriculture data, since Sideman began sharing her findings, the land in New England devoted to growing sweetpotatoes has increased from just 4 acres in 2007 to 183 acres in 2022. Over that same period, yields and crop value have grown by a staggering 98 percent.

Bruce and Jenny Wooster of Picadilly Farm in Winchester, New Hampshire, have been growing sweetpotatoes for almost two decades, and they have relied on Sideman's research to expand their operations.

"Becky has given us valuable insight on everything from selecting the best varieties

and spacing our plants to mitigating damage from grubs and curing our crops post-harvest," says Bruce Wooster. "She's been encouraging and available to farmers like us, supporting us with site visits and regular correspondence, and she has shared with us her conference presentations and articles on best practices."

In 2023, Sideman and research scientist **Lilly Hartman** conducted more trials to evaluate new sweetpotato varieties. "We wanted to ensure that the recommendations we give farmers are current and relevant," Hartman explains. Their current trials, in which they are testing 25 varieties across New Hampshire and Maine, allow them to determine which ones perform best.



"We're always guided by what farmers need," Sideman adds. "Their experiences help shape our research and ensure we're addressing real-world challenges." 🍠

*This research is supported by the New Hampshire Agricultural Experiment Station.*

## Expanding Climate-Resilient Agriculture

The University of New Hampshire has been awarded \$10 million from the U.S. Department of Agriculture to develop more sustainable ways to implement climate-smart agriculture strategies to expand farming and food production while enhancing economic opportunities, providing important ecosystem services like clean water and air and creating healthy communities in New England.

“Approximately 75 percent of New England is made up of forests, which can be challenging when trying to expand farming opportunities to meet the growing need for more sustainable ways to produce locally grown food,” said **Heidi Asbjornsen**, professor of natural resources and the environment and principal investigator for the project. “But those forests also need to be preserved, because they are a globally important carbon sink, and they provide many other important ecosystem services, such as clean and reliable water supplies, flood control, biodiversity, wildlife habitat and recreational opportunities.”

The five-year project, titled Promoting Climate-Smart Sustainable Agriculture in New England through Regionally Adapted Agroforestry Systems, is known as ADAPT. It will examine how agroforestry — the practice of integrating crop and animal farming in forested areas — can reduce impacts on ecosystems and balance sustainable agriculture with climate mitigation, adaptation and resilience.

The researchers anticipate that this project will contribute to increasing local food production in New England by 15 percent and raise annual carbon sequestration by 5 million tons; foster new agroforestry market opportunities; and enhance New England’s capacity to balance food production with the benefits that forests provide. Co-principal investigators include UNH’s **Steve Roberge**, **Alexandra Contosta** and **Kate Guerdat**, Theresa Ong of Dartmouth College and Mark Ashton of Yale University. 🍏



# UNLOCKING EQUITY IN NEW HAMPSHIRE'S AQUACULTURE INDUSTRY

As New Hampshire's aquaculture industry continues to expand, understanding the demographics of those involved is essential for building a just and equitable seafood system. **Natalie Lord '22G**, a doctoral student in the natural resources and environmental studies program, is conducting research that highlights the demographic challenges and opportunities within the region's growing aquaculture sector and the broader seafood system.

"By identifying the barriers that women and nonbinary individuals face within this industry, we can create more inclusive policies that foster a more diverse workforce," says Lord.

Lord's advisor, **Easton White**, an assistant professor in the department of biological sciences, emphasizes the importance of this work to sustainable local aquaculture production. Their research provides critical insights into industry barriers, including access to funding, training and equipment, and it identifies opportunities to support underrepresented groups.



By addressing these challenges, the team hopes to unlock the full potential of local aquaculture and contribute to a fairer and more sustainable seafood system. 🍷

*This research is supported by the New Hampshire Agricultural Experiment Station.*

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## A SERIOUS CASE OF THE BLUES

In 2022, COLSA researchers discovered the first pair of mated blue crabs in the Great Bay Estuary (GBE) — the official confirmation that warming conditions in the Bay have created a hospitable habitat for a species typically found farther south.

The presence of a breeding population of blue crabs, which feed on bivalves, including clams and oysters, is expected to have serious impacts on the Great Bay ecosystem, although the extent of those impacts is not yet known. Since the mated pair was discovered in 2022, more than two dozen crabs, including a second mated pair, have been caught in the GBE.

**Bonnie Brown**, professor and chair of the department of biological sciences, notes that

although indicators of a sustained population have not been detected in the GBE, “the arrival of blue crabs capable of creating a sustained population could be really bad news both ecologically and economically.”

**Gabriela Bradt '05G**, fisheries and aquaculture specialist for New Hampshire Sea Grant and UNH Cooperative Extension, agrees. She is leading a crab monitoring project with the Great Bay National Estuarine Research Reserve to establish a population baseline, monitor for early detection of several crab species of concern, and track trophic interactions. Regarding blue crab management, Bradt says the team needs more information about population size and impacts, but “it is definitely on our radar.”