Fall 2021

THRIVE

NEWS FROM THE COLLEGE OF LIFE SCIENCES AND AGRICULTURE

FROM SOIL MICROBES TO DIETARY HEALTH

How COLSA Research Improves the Ways We Sustain Our Planet and Ourselves

University of New Hampshire

From microbiomes to watersheds, COLSA is home to an outstanding team of scholars and researchers providing thought leadership through the science and actions that are at the root of a sustainable future.

ON THE COVER

Caterina Roman '22 *and Professor* ***Becky Sideman*** *harvesting purple sprouting broccoli at UNH's Woodman Horticultural Research Farm as part of a project to extend the growing season.*

TOWARD A JUST AND SUSTAINABLE LIFE FOR ALL

The College of Life Sciences and Agriculture has long served as a driver of innovation and a pioneer in sustainability. During my first year as dean, I've had the chance to see the impact our teaching, engagement and research have in crafting pathways to a more sustainable and just future for all. While "sustainability" is a complicated target, there are so many ways that collectively we can decrease waste and reduce inequities while increasing value and creating dynamic opportunities for our communities to be resilient and prosperous in the face of change and challenges.

In this issue of THRIVE, we want to give you an idea of the broad extent that our students, staff and faculty work to define and drive sustainability. From microbiomes to watersheds, COLSA is home to an outstanding team of scholars and researchers providing thought leadership through the science and actions that are at the root of a sustainable future. Among other contributions, we are fostering new ideas about how we produce, prepare and eat food; identifying and overcoming barriers to access healthy food; and bringing into a single conversation sustainable energy, waste reduction, climate change impacts and small business development.

These conversations, programs and projects, which represent just a few of the ways we make a difference, build on the strong relationships our faculty and staff have across UNH and with partners in the region and help us drive the economic growth needed to provide jobs that will last and foster social and financial mobility for all Granite Staters.

And as we continue to navigate the challenges of the COVID-19 pandemic, COLSA is looking ahead. We are embarking on a strategic planning process that will help us deliver on our commitment to student success, research that matters and engagement across communities. We are building from core values of discovery, inclusion and transparency. Thank you for being part of our community, and I look forward to working with you in driving positive change.

Sincerely,

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

THRIVE CONTENTS

University of New Hampshire
College of Life Sciences and Agriculture

Curious what the flower of a carnivorous purple pitcher plant looks like?

Or if a horsefly from 1896 (the year Thompson Hall was built) looks different than one from 2021?

The answers to those questions and more can be found at the new UNH collections website, the gateway to our Hodgdon Herbarium, which houses more than 200,000 plant specimens, and our insect collection, which is home to more than 700,000 insects and other arthropods.

Both collections are open to the public by appointment.

colsa.unh.edu/unh-collections

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Scan using smartphone camera app to visit the UNH Collections website

A FOCUS ON FOOD PRODUCERS

COLSA researchers are working to provide New England growers — whether they farm on land or in the water — with applied solutions that are proven to increase the economic viability of their businesses and position them to operate in the most environmentally, economically and socially sustainable way possible. Here are two of the many projects currently underway.

Enhancing profitability and expanding markets for New Hampshire growers

Becky Sideman, professor of sustainable horticulture production, conducts applied research to demonstrate efficacy and explore the suitability of new crops, crop varieties and production methods for New Hampshire vegetable and fruit growers. She currently is experimenting with seedless table grapes, figs, winter sprouting broccoli and mini-cabbages and has produced a wide variety of practical recommendations and significant scientific results. As part of her work, Sideman, who is also a sustainable horticulture specialist with Cooperative Extension, provides information to growers about new production technologies and practices. **Caterina Roman '22** is assisting Sideman with her research.

Quantifying Ecosystem Services Provided by Oyster Farms in New Hampshire

Ray Grizzle, research professor of biological sciences, began conducting oyster research 20 years ago with efforts to restore wild oysters in the Great Bay Estuary. When he began his work, New Hampshire had only two licensed oyster farms; now it has 32 commercial mollusk operations. Still, Grizzle says that Great Bay's oyster production is a fraction of what it could be.

His current research involves looking at the role of oyster farms in providing "ecosystem services" such as water filtration and habitat for other species. The goal is to highlight oysters' positive ecological impacts on the Great Bay Estuary's ecosystem, thereby influencing current management and regulatory policy and paving the way for more industry growth. **Marissa Gast '21** and **Megan Buff '23** are assisting Grizzle with his work.

BOOK-SHARE ENCOURAGES CONVERSATIONS ABOUT BIAS, PRIVILEGE AND EQUITY

As part of a broad effort to promote inclusion, diversity, equity and access in the college, Dean **Anthony S. Davis** launched a book-share program in fall 2020 by offering to buy any interested COLSA student, staff or faculty member a book of their choice on the topic of racism. To date, 58 people have received books.

"The book-share is an entry point intended to get people reading, thinking and talking about racism and bias," says Davis. "This college has people who care so deeply about both science and helping the world be a more inclusive place. My vision is to bring those together and daylight the possibility of science helping us to become a more equitable society. We start by creating a diverse, equitable and inclusive place of work and study."

Under Davis's leadership, and following a bylaws amendment vote by the faculty, the college's Inclusion, Diversity, Equity and Access (IDEA) Committee has been officially recognized — a step that will help expand its presence and influence within the COLSA community. In addition, he has launched "Open IDEA Hour" sessions to discuss diversity, equity and inclusion ideas and concepts that emerge in teaching, research and the workplace.

RESCUE MISSION

Food repurposing project tackles food waste and hunger

According to the USDA, more than 80 billion pounds of food is wasted every year in the U.S. Yet in 2019, more than 35 million people were food insecure — and that was before the pandemic.

One way to address hunger in the country seems obvious: figure out how to get the wholesome, edible food that is headed to landfills into the hands of people who need it. COLSA's department of agriculture, nutrition, and food systems (ANFS), UNH Hospitality Services, and Gather, a non-profit food pantry and food distribution network based in Portsmouth, are working together to do just that, taking unused food from the UNH dining halls and donated food that would otherwise go to waste and transforming it into ready-to-eat meals for food insecure individuals and families in the greater New Hampshire Seacoast.

The symbiotic partnership draws from UNH Dining's ongoing work to reduce food waste on campus, led by registered dietitian nutritionist **Rochelle L'Italien '88,** Gather's need for kitchen space to produce ready-to-eat meals for customers who lack access to cooking facilities and/or have mobility issues, and ANFS's commitment, under the leadership of department chair **David Mortensen,** to extending its farm-to-fork-to-wellness mission beyond the classroom.

"This is an awesome project that needed to happen," says **Amy Taetzsch '09,** clinical assistant professor of nutrition and director of the master of nutritional sciences with dietetic internship. Taetzsch joined the team earlier this year and has been instrumental in moving the project forward. "We can have a lot of influence within the greater community, and I also see this project as impactful

for our students. It's important that they be actively engaged in our communities and not just focused on the academic side."

Twice a week, Emily Gaddis, Gather's project coordinator and the team chef, arrives at the Barton Hall teaching kitchen. With help from faculty, staff and student volunteers, ingredients like chicken, egg noodles, cherry tomatoes, snap peas, red onions and mushrooms become a zesty pasta primavera; ground turkey becomes hearty meatloaf; and chicken, cheese and pasta become a rich and flavorful buffalo chicken mac and cheese.

"I love the innovation, excitement, support and possibilities," says Gaddis. "Many volunteers have little to no cooking experience so it's a great way to teach some culinary skills while also fighting food insecurity, reducing food waste and building community engagement. There's a lot of layers to what we're doing."

Once the meals leave UNH, they go to Gather's Pantry Market and mobile markets for distribution. During the program's pilot phase, launched in April 2021, the team produced 200-300 meals per week. They anticipate ramping up production in the fall and are working on a plan to expand distribution to food insecure students on campus.

"It's gratifying to see the university leverage its resources and expertise and work with community partners to address pressing challenges — in this case hunger, healthy food access, sustainability and health on campus and beyond," says **Joanne Burke '01G,** clinical professor emerita and Gather board member. "We as a university community can make a significant difference in addressing food insecurity by redirecting healthy food to those with limited access."

And how are people enjoying the meals?

"They love them!" says Gaddis. "They fly off the shelves."

CONVERTING WASTE INTO ENERGY: RESEARCH UNCOVERS NEW USE FOR COW MANURE

UNH researchers recently completed a project at the UNH Organic Dairy Research Farm studying whether captured energy from composted cow manure can be converted to a viable source of heat, thereby reducing dependence on fossil fuels like oil, coal and natural gas. The answer is yes, says **John Aber,** professor emeritus of environmental science and the project's principal investigator.

Composting generates a lot of heat and decomposing manure can reach an internal temperature of 150 degrees Fahrenheit. To capture that heat energy, Aber and his team designed a system inside the farm's existing composting facility in which air is circulated through manure and wood shavings that had been used for animal bedding. As the air circulates, hot vapor produced by decomposition is extracted through pipes and used to heat a water tank. The hot water is then available for space heating or washing. Under ideal conditions — a steady supply of fresh manure and a steady demand for heated water — the system can generate more than 800,000 BTUs a day. That's enough energy to heat 12,500 to 15,000 square feet of interior space in USDA climate zone 5, which stretches across 32 states from New Hampshire to Washington.

Reducing dependence on fossil fuels isn't the only advantage of Aber's system. Composting manure in a controlled indoor environment minimizes runoff and groundwater pollution. And there's the compost itself, which can reduce the need for nitrogen-based fertilizers.

Next up is to develop a plan to use the system to provide winter heat to a greenhouse that will grow vegetables for UNH Dining. The goal is to demonstrate both waste energy capture and season extension technology.

AWARDS & HONORS

University and College Awards

Vanessa Grunkemeyer, *2020 COLSA Teaching Excellence Award*. Grunkemeyer is a clinical assistant professor in the department of agriculture, nutrition, and food systems, the undergraduate program coordinator for the animal science program and director of the pre-veterinary advising program.

Mary Katherine Lockwood, *2020 COLSA Outstanding Advisor Award.* Lockwood was a clinical associate professor in the department of agriculture, nutrition, and food systems and the chair of the pre-professional health committee. She retired in May 2021.

Kelley Thomas, *2021 University of New Hampshire Distinguished Professor Award.* Thomas is a professor, the Hubbard Chair of Biological Sciences, and the director of the Hubbard Center for Genome Studies.

Juan Rojo, *2021 COLSA Teaching Excellence Award.* Rojo is a clinical assistant professor in the department of molecular, cellular, and biomedical sciences.

Arturo Andrade, *2021 COLSA Outstanding Advising Award.* Andrade was an assistant professor in the department of biological sciences.

Dean's Awards for Distinction 2021 Winners

The Dean's Awards for Distinction recognize individuals or groups who have made notable contributions to the college and/or the broader community that advance the standing of COLSA's teaching, research and service mission.

Luke Hydock, manager of the Macfarlane Research Greenhouses

Jesse Stabile Morrell '99, '04G, '13G, principal lecturer in the department of agriculture, nutrition, and food systems and program coordinator for the nutrition program

Wendy Rose, program manager for the department of natural resources and the environment

Paul Tsang, professor in the department of molecular, cellular, and biomedical sciences and faculty director of the Hamel Center for Undergraduate Research

COLSA Community of Teaching and Research Scholars Award

*Established by professor emeritus of molecular, cellular, and biomedical sciences **Chuck Walker** and his wife, Wilise Walker*

Nathan Furey, assistant professor in the department of biological sciences

UNH Sustainability Awards

In 2021, the UNH Sustainability Institute launched the UNH Sustainability Awards, which recognize activities and achievements that best embody the principles and practices of sustainability. Here are the winners from COLSA:

Platinum

John Aber, professor emeritus of natural resources and the environment. He is also affiliated with the Institute for the Study of Earth, Oceans, and Space.

Gold

Ocean Projects (**Elizabeth Fairchild,** research associate professor of biological sciences, **Larry Harris,** professor emeritus of biological sciences and **Rob Swift,** professor of ocean and mechanical engineering. All are affiliated with the UNH School of Marine Science and Ocean Engineering.)

Andrew Odgen, senior lecturer in the agriculture, nutrition, and food systems department

Pete Kane '18, production manager at the Farm to You NH high tunnels

Basic and Applied Spatial Analysis Lab (**Russell Congalton,** professor of remote sensing and geographic information systems, **Jianyu Gu,** postdoctoral researcher, **Heather Grybas '21G, Ben Fraser '15, '17G, '21G, Molly Yanchuck '21G** and **Jake Dearborn '21**)

Silver

Elizabeth Cain '21, UNH Dietetic Internship Program

Elizabeth Fairchild

Bronze

Sabrina Grovom '21

Forrest Hayden '21

Sadie MacIver '21

THE SECRET LIFE

Creating agricultural resiliency in a changing climate

When facing pyramids of polished produce in brightly lit supermarkets or browsing heirloom tomatoes and sweet corn at local farmers' markets, soil is likely far from our minds. But soil is where the food we eat begins. It's also the foundation of a resilient and sustainable agricultural and food system that can adapt to and offset the effects of a changing climate.

That's the motivating force behind the work of three scientists in COLSA and the NH Agricultural Experiment Station (NHAES) who are researching practical strategies for understanding and managing soil — a complex, dynamic and often overlooked substance that is fundamental to human, animal, plant and planet health.

"Our research group aims to understand the fundamentals of the ecology of soils, a discipline that is advancing rapidly due to technological changes and farmer interest in soil health," says **Jessica Ernakovich,** assistant professor of microbial ecology in the department of natural resources and the environment and co-director of the Center for Soil Biogeochemistry and Microbial Ecology along with professors **Serita Frey** and **Stuart Grandy.**

She and her collaborators are investigating how agricultural management affects the diversity of microbial communities and soil function on New Hampshire farms.

Ernakovich says the team's ultimate aim is to enable farmers to manage their microbes when they manage their soils. "Given that microbes can deter pests, improve drought tolerance, build soil organic matter, and so much more, managing them for benefits to agroecosystem sustainability — environmentally, socially and economically — and resilience is of the utmost importance, particularly as we ask more of our agricultural soils in a warming world that needs to feed more people," she says.

OF SOIL

Grandy, who studies how soil organisms regulate ecosystem processes such as nutrient cycling, organic matter turnover, trace gas emissions, and productivity, also sees soil as agriculture's first line of defense in a changing climate. He and his team are investigating the role soil plays in ecosystem resiliency, the influence of crop diversification on soil microbial resistance and resilience to drought and flooding, and how nitrogen — a key nutrient in crop production — is affected by soil organic matter, which is the decomposing plant and animal material in soil.

Recently, Grandy looked at the degree plants use and benefit from available nitrogen in soil during a drought. Not only do plants absorb less nitrogen from the soil during drier periods, which contributes to lower crop yields, but the unused nitrogen in soil can also lead to adverse environmental impacts such as groundwater contamination.

"Our data show crops are not using all the nitrogen that's available in the soil. Without new management practices, these high rates of nitrogen loss will worsen," says Grandy. "We advocate an approach that takes economic aspects into consideration while also emphasizing that environmental sustainability is key in creating cropping systems that can withstand changing weather patterns."

The team found that rotating crops — growing different, complementary plants during successive years — increases corn yields even when water was less plentiful. The findings indicate that diversifying crops is an effective, long-term strategy for strengthening food production systems globally in the face of a changing climate and environmental degradation risks.

"We expect that our findings will extend to agricultural sites in New England and other regions, whether in large or small fields, wherever there is concern about sustaining crop yields under variable climates," says Grandy.

Anissa Poleatewich, assistant professor of plant pathology in the department of agriculture, nutrition, and food systems, studies how diseases in horticultural and floricultural crops can be better managed through sanitation, beneficial microbes and plant resistance.

Poleatewich has brought her expertise about sustainability in agriculture into the greenhouse, where she is studying substrates: economical and sustainable materials used to grow plants in containers. She and her collaborators are evaluating three types of engineered wood fiber substrates for their level of effectiveness mitigating disease and improving the effectiveness of biofungicides to suppress disease in greenhouse agriculture. One of these materials, pine wood fiber, can be readily produced and cheaply delivered in the Northeast.

"The challenge for sustainable agriculture is to develop a holistic approach that mitigates the risks of traditional agro-chemical pesticides while ensuring pest populations are kept below economic thresholds," she says. "Growers continue to incur yield and quality losses due to changing climates, nutrient deficiencies, drought, heavy metal and salt stress, microbial pathogens and insect pests."

Poleatewich believes that overcoming these and future sustainability challenges in the U.S. will increasingly rely on new technologies and management strategies for integrating naturally occurring soil microbes with traditional agricultural practices.

"Soil is the foundation for food production and, by extension, human health," says **Anton Bekkerman,** director of NHAES and associate dean of COLSA. "The scientific innovations and expertise our researchers are contributing represent the groundwork needed to increase agricultural resiliency in response to climate change — a critical and urgent mission of our land-grant university system for sustaining lives and livelihoods."

ADVANCING AQUACULTURE

UNH research is enhancing the sustainability of a major global industry

For many, the term food pest likely conjures images of bugs damaging plants or spreading diseases to livestock. But pests are also a challenge in aquaculture, an industry that boasts an economic impact of more than $31 billion and employs roughly equal numbers of male and female workers. Now, COLSA scientists with the NH Agricultural Experiment Station are developing methods to sustainably reduce pests that threaten the global salmon and shellfish aquaculture industries.

Elizabeth Fairchild '91, '98G, '02G, research associate professor of biological sciences, is testing whether using lumpfish as "cleanerfish" — fish that eat parasites off other fish — may be a sustainable way to manage a common parasite known as sea lice that preys on farmed salmon.

Sea lice are a naturally occurring parasite that feed off fish mucus, skin and blood. They cause open wounds on the fish, and in the worst cases, kill them. But mitigating sea lice by existing methods can be very costly to fish farming operations. Lumpfish, Fairchild explains, eat parasites off salmonids that are farmed in cages in nearshore coastal waters in the northern Atlantic Ocean. Cleanerfish are used in all northern Atlantic countries where salmonids are farmed except the United States.

Currently, U.S. commercial operations manage sea lice by exposing the salmonids to thermal baths on a boat, which can be stressful and harmful to the fish — and not effective over the long run. Prior to the development of these baths, environmentally harmful pesticides that have since been banned in the United States were used. By using lumpfish, Fairchild aims to support a more sustainable way to manage sea lice infestations on salmonid farms and increase domestic salmonid production.

"Today many leased sites in Maine are not used or sit fallow for extended periods because of historically high sea lice concentrations," Fairchild says. "Using cleanerfish to decrease the damage inflicted by sea lice can increase domestic salmonid production because more farm sites can be used — and used more frequently."

An added benefit: Fairchild says there are new business opportunities for hatching and growing out lumpfish for salmon farmers — a market that does not currently exist. Such business opportunities could add to New Hampshire's growing aquaculture industry, which had nearly $1 million in sales in 2018. Indeed, local oyster production is already booming, having increased by 229 percent from 2013 to 2018 according to the U.S. Census of Aquaculture. Like salmon farmers, however, many shellfish producers are plagued by a pest that is causing major problems — and major costs.

Ectopleura crocea is a relative of jellyfish and is considered a fouling organism, which means that, similar to barnacles, they aggregate on man-made structures — in the case of local shellfish farms, aquaculture equipment.

"In order to get happy and healthy farmed seafood, we need the nets and equipment to function properly," says **Sydney Birch '22G,** a UNH doctoral student in molecular and evolutionary systems biology. "The problem is that colonies of *Ectopleura crocea* are clogging up these nets and

COLSA scientists are delivering on the NH Agricultural Experiment Station mission by developing methods to sustainably reduce pests that threaten the global salmon and shellfish aquaculture industries.

structures, which reduces the waterflow to farmed seafood. This robs the seafood of vital nutrients, which can negatively impact the growth and quality of seafood."

There's also an economic impact. The aquaculture industry estimates that the cost of managing and removing *Ectopleura* accounts for as much as 10 percent of the total production cost of farmed seafood, and **David Plachetzki,** associate professor of molecular, cellular, and biomedical sciences, notes that in Great Bay and New Castle shellfish fisheries, workers need to remove fouling organisms from culture systems annually and often throughout the growing season. Preliminary findings from Plachetzki's latest research project, however, suggest possible ways to dissuade these animals at early, larval stage from calling aquaculture production systems home.

Ectopleura larvae use a combination of light, taste and touch information to choose when and where to metamorphose into the adults that cause problems. Working with Plachetzki, Birch tested the effects of different colors of light, chemicals involved in taste and different surface textures to pinpoint what sensory pathways the larvae are using to identify a good habitat. She found that larvae were least likely to call aquaculture production systems home when there was a surface texture and no biofilm. And it turns out, larvae don't like red light.

"Ultimately," Birch says, "this research will be used to prevent *Ectopleura* larvae from choosing aquaculture nets and structures to live on." This in turn could help reduce the price to farm marine species like salmon and oysters. That means seafood that's not only healthier but less expensive for consumers.

FOOD PRODUCTION AT COLSA

FOOD PRODUCED

45,258 gallons
OF MILK

6,911 pounds
OF PRODUCE

395 pounds
OF POULTRY AND LAMB

WHO PRODUCES FOOD

75
UNH STUDENTS

23
UNH FACULTY & STAFF

PRODUCING ORGANIZATIONS

Farm to You NH (Food production field course)

Livestock Management

PEEP (Poultry Experiential Education Program)

UNH Dairy Farm/CREAM (Cooperative Real Education in Agricultural Management)

Woodman Horticultural Research Farm

> "Our goal is to provide UNH Dining with everything that we can grow and allow them to distribute that to as many students as possible."
>
> – **Pete Kane '18**, farm manager, Farm to You NH

WHERE FOOD GOES

100%
BACK TO NEW HAMPSHIRE

CAMPUS: UNH Dining Services, UNH Dairy Bar, UNH Conferences & Catering, UNH Brewing Science Lab

THE GREATER DURHAM AND SEACOAST COMMUNITY: GATHER & Waysmeet Center Food Pantries

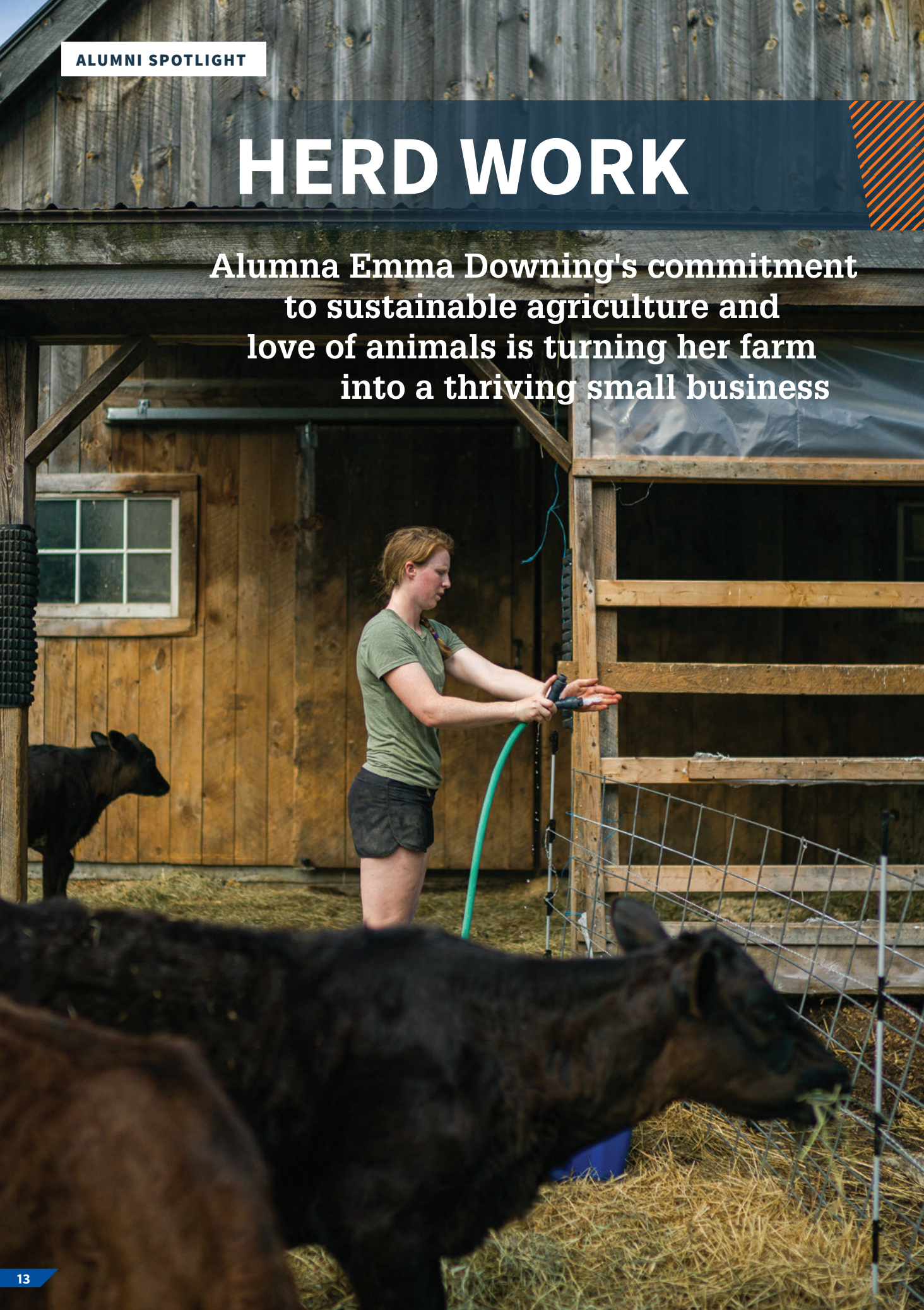
NH BUSINESSES: H.P. Hood & Stonyfield Farm

THE FARM: Compost

Note: Data from the last full production year.

HERD WORK

Alumna Emma Downing's commitment to sustainable agriculture and love of animals is turning her farm into a thriving small business



Running a farm is never dull. On any given day, **Emma Downing '16** may be planting vegetables, milking cows, chatting with customers at a local farmers market or answering email. Occasionally, she ropes her mother, Deb, or fiancé Steve Grant, into rounding up rogue calves that roam off the pasture at their farm, Blue Heron Farm in New Boston, New Hampshire. But Downing wouldn't have it any other way.

"I've always been someone who likes to be outside," she says. "I get a runner's high when I'm outside getting my hands dirty. Farming is good, hard work."

Farming is part of Downing's heritage. Named for the birds that fly over the property, Blue Heron Farm has been in her family since 1950, when it was a dairy farm run by Downing's grandfather. He eventually sold the property to Downing's parents, who briefly raised bison when she was a little girl. The family sold off several parcels of land but retained the primary acreage; Downing now farms 11 acres and leases an additional five or so acres nearby.

Downing discovered her love for animals at COLSA and in the school's Cooperative Real Education in Agricultural Management (CREAM) program. A sustainable agriculture and food systems major, Downing originally focused on horticulture, but her self-described "cow obsession" blossomed junior year when she joined CREAM. "CREAM was ideal because I was able to learn while doing," Downing says. "I was always a barn kid, and it was nice to hang out at the dairy barns. I loved the behavior of the cattle and learning about their nutrition. I learned how to take care of them but also learned the business side of farming. I really respect farmers in general. Taking care of livestock is hard work."

94% of farms in New Hampshire are small farms. With average collective sales of $25.5 million, they make up 86% of all farm-related sales in the state.*

Sustainability is not just a buzz word to Downing; she is committed to diversified farming methods to help keep Blue Heron Farm — and her animals, which include 10 cows, 11 piglets and 100-plus laying hens and meat chicks — healthy. Downing employs several techniques to keep her livestock flourishing, build the farm's soil health and sustain its natural landscape, including rotating where animals graze and using natural tillage and organic growing techniques. "We utilize different practices to make the land healthy," she says. "We don't overuse fertilizer, we make compost from our animals' manure, we make sure we're not overgrazing our pastures — we want to maximize what the land gives us while regenerating it."

One method Downing employs is regularly moving the chickens and pigs from pastures into wooded areas. "They get to root and find things in the forest — the pigs root for grubs and enjoy root masses, the chickens are looking for bugs," she says. "It keeps them engaged." Her cows are rotated daily through the main pasture and through two additional fields down the road. During a drought, they are

**The USDA defines "small farm" as a farm that has $250,000 or less in sales. Statistics come from the 2017 Census of Agriculture.*

RECIPE

BLUE HERON FARM COTTAGE PIE

- ½ pound BHF ground beef
- ½ pound BHF ground pork
- 1 medium onion, chopped
- 2 cloves garlic, minced
- 1 tablespoon Worcestershire sauce
- Salt and pepper to taste
- 1 tsp dried thyme
- 4 large Yukon Gold potatoes
- 1 16 oz can creamed corn
- 1 cup corn kernels, preferably fresh
- ½ cup beef broth
- ¾ cup grated cheddar cheese

In a cast iron skillet, sauté onions and garlic until soft and fragrant. Add meat and cook until fully done. Add salt, pepper, Worcestershire sauce, thyme and beef broth. Simmer together for 10 minutes.

In the meantime, boil potatoes until fork tender. Prepare mashed potatoes the way you like them and season to taste.

Mix regular corn into meat mixture and transfer into a greased casserole dish. Pour the can of creamed corn in an even layer over top. Finally, top your dish with a thick layer of mashed potatoes and a healthy dose of sharp cheddar cheese.

Bake uncovered in the oven at 400 degrees for 20 minutes then broil to a golden brown, for approximately 5 minutes more. Best when shared with friends and family.

moved into the woods to eat hay. “Rotation is important to me,” Downing says. “There’s a visible difference in a well-managed pasture, the density and varieties of forage and how it bounces back during a drought, so that’s what we focus on.”

A “wild assortment” of cows is also part of Blue Heron’s sustainability plan. Downing looks for calves from dairy farms or backyard farmers who have cross-bred dairy cattle with beef cattle. “They’re less expensive than full-bred dairy cows,” she says. “I raise them 100% grass-fed. They have calm temperaments because they’ve got dairy bred into them but they’re wild-looking — some have lots of different spots and they end up being taller than beef cattle. They have a lot of personality!” She got a new perspective on sustainability and the benefits of raising grass-fed cattle while working at Benedikt Dairy in Goffstown, a 100% grass-fed dairy operation.

“That’s where I learned the benefits of grass-fed beef and grazing,” she says. “That transitioned me into the practices I believe are important to my animals.”

Downing has big plans for the farm. In addition to selling vegetables, grass-fed beef, pork and eggs at area farmers markets, she and Grant will open Meadow View Events at Blue Heron Farm this summer. The hilltop outdoor events venue, which Grant, a landscaper, has designed, launches officially with the couple’s wedding in August. “We’re working with a local caterer who’ll use all of our vegetables and meat in his cooking,” Downing says. The couple hopes to host other events — baby showers, family gatherings, pig roasts and more — featuring farm-to-table menus with Blue Heron produce and meat and sustainable amenities that produce as little waste as possible. In true family style, Deb Downing will help manage Meadow View Events.

When she isn’t managing the farm, Downing enjoys cooking and eating meals prepared with Blue Heron Farm’s fresh vegetables and meats (for a sample of one her favorites, see the recipe on page 14). “I love picking out the meat and fresh produce I want to eat — it’s wonderful to sit down and eat the food you’ve raised,” she says.

And that’s worth the hard work.

STUDYING THE RELATIONSHIP BETWEEN DIET AND COGNITIVE HEALTH

Sophie Kenny ’19, ’22G earned her bachelor’s degree in nutrition and wellness and a graduate certificate in the didactic program in dietetics from UNH. The Stratham, New Hampshire native is now a master’s student in nutritional sciences and plans to become a registered dietitian. She is currently working as a research assistant in Assistant Professor **Sherman Bigornia’s** lab and studying whether specific types of saturated fats that are found in dairy foods can help prevent cognitive decline among Hispanic/Latino adults.

COLSA: Why is your research important?

Sophie: This research is important for many reasons. In the U.S., roughly one in nine people suffer from dementia. Hispanic/Latino populations are disproportionately affected. This may be related to the high prevalence of cardiometabolic risk factors, such as type 2 diabetes and hypertension, which have been associated with cognitive decline.

Current dietary guidelines recommend limiting saturated fat consumption, but Dr. Bigornia’s research, which found links between certain saturated fatty acids found in dairy products and cognitive function among Hispanic/Latino adults in the U.S., suggests that full-fat dairy may have some cognitive benefits.

COLSA: What do you wish your colleagues, friends and family knew about your work?

Sophie: The importance of our dietary intake regarding both mental and physical health. Our food choices can not only decrease the risk of certain illnesses, it can also improve our mood and overall cognitive functioning skills.

SURVEY SAYS...

Data Yields Key Insights on Young Adult Health and Nutrition

In 2005, when **Jesse Stabile Morrell '99, '04G, '13G,** principal lecturer in the nutrition program, began asking students in the Nutrition in Health and Well Being course to use the results of their own blood work and health assessments, she was just looking to make students feel more connected and invested in what they were learning. Then she had another idea.

"I thought, 'We're generating all these data, shouldn't we do something with it?'" says Morrell.

And like that, the College Health and Nutrition Assessment Survey (CHANAS) was born. Today, what began as an effective way to engage students in the classroom has become one of the most comprehensive databases of health and nutrition information for college students between the ages of 18 and 24 in the U.S.

Every year for the last 16 years, 90 to 95% of the 600 or so — and sometimes as many as 900 — students who enroll in Nutrition in Health and Well Being agree to participate in the survey. They share personal information including blood pressure, cholesterol, weight, perceived stress, eating habits, fitness level and chronic disease risk to a confidential database — as well as answer novel research questions posed by upper classmen and graduate students. To date, CHANAS has collected data on more than 10,000 UNH students.

While integrating personal data has succeeded in making coursework resonate with students, the process of collecting and analyzing the data has produced an even more significant learning experience.

"Working as an undergraduate student on the CHANAS project has been a fascinating first-hand look into research development, data collection and working with student participants," says **Nicole Yeomans '22,** a nutrition: dietetics major. "From being one of the survey participants to working in the labs during the screening process, I've developed a greater appreciation for research and the value of longitudinal data collection."

Before CHANAS, not much data existed on the health and nutrition of college students between the ages of 18-24, a transitional time when many young adults leave home. It's also a key time, says Morrell, for developing habits that can influence health for decades to come.

The information from the survey has been shared with UNH Dining, which prioritizes healthy eating, and Healthy UNH, which provides health and wellness resources to the UNH community, to give both groups an idea of the health status and health risk factors that exist among the student population.

The survey data also represent a treasure trove for undergraduate and graduate researchers: it has been the basis of more than 40 undergraduate student projects (including 10 honors theses), 37 graduate student projects, 27 national conference presentations and four student-led peer-reviewed manuscripts.

A study of food insecurity among undergraduates on campus by **Alana Davidson '17** uncovered a surprising number of students who reported lacking reliable access to affordable, nutritious food. With help from UNH faculty and administrators, Davidson used the survey results to create Swipe It Forward, a program that gives food insecure students access to meal credits that have been donated to a "swipe bank."

Morrell, who anticipates that CHANAS will provide valuable insight into the pandemic's impact on student health, access to food and lifestyle behaviors, sees even more long-term potential for data.

"I think we have still-developing value in reporting out on young adult health priorities," she says. "There is an under-recognized area of opportunity for us to help emerging adults pivot in their decisions and their lifestyle choices and help them make healthier choices from that step forward. The ripple effect would be huge."

A Look Back at Remarkable Careers

Our retirees have left an indelible mark on COLSA, and the college won't be the same without them. Here, a few of them share what they consider their most significant professional achievements.

John Aber, professor in the department of natural resources and the environment: Helping UNH achieve and maintain highest national rankings in environmental research and sustainability.

Charlie Caramihalis, professor in the department of agriculture, nutrition, and food systems: Since I was hired, I have worked to be the best teacher I could be in the classroom, and I am confident that I have succeeded in this role.

Tom Davis, professor in the department of agriculture, nutrition, and food systems: My lab's leading role in illuminating the evolutionary ancestry of the cultivated strawberry and in designing the first strawberry single-nucleotide polymorphism genotyping array.

Ted Howard, former associate dean of COLSA and professor in the department of natural resources and the environment: I spent 22 of my 40 years at UNH as either a chair, director, or associate dean. I like to think those leadership roles helped faculty and students achieve their goals. I am proud to have co-authored the primary text in forest management that has been used throughout the U.S. and Canada for the last 20 years and is my most often cited work. Finally, I am most proud of how my students, undergraduate and graduate, have contributed to their professions and to society.

Alberto Manalo, associate professor in the department of natural resources and the environment: The achievement that gives me the most personal satisfaction is that, apparently, I have touched the lives in a positive way of some of my students. Their kind words mean a lot to me.

Adele Marone, clinical associate professor in the department of molecular, cellular, and biomedical sciences: I consider several professional achievements to be significant, but among my most important are receiving the longest possible accreditation period for the medical laboratory science (MLS) program — both times that accreditation was up for review during my tenure — and having MLS students consistently achieve scores on the Board of Certification exam above the national average.

Pete Pekins, professor in the department of natural resources and the environment: Three related things with students: mentoring so many graduate students who manage New England wildlife in state agencies, the privilege of teaching more than 6,000 undergrads in classes, and hiring and providing invaluable experience for more than 500 undergrads on research projects.

Regina Smick-Attisano, former executive director of the Thompson School of Applied Science, associate professor in the department of natural resources and the environment and academic coordinator for the provost's office: Being the executive director of the Thompson School of Applied Science for 20 years, creating a positive academic environment for students, faculty and staff, and allowing for a caring culture where each person could reach their full potential.

Jon M. Wraith, former dean of COLSA and director of the NH Agricultural Experiment Station, professor in department of natural resources and the environment: Probably the most enduring achievement is having had the great fortune to help hire more than half of our current COLSA faculty members, as well as a significant number of our great staff members. Included within that was our advancing from 11% to about 40% of tenure track faculty who are women, within only a dozen years.

FACULTY AND STAFF RETIREMENTS

Every year brings a round of retiring faculty and staff but 2021 is a standout due in part to an early retirement incentive package offered by the university. This year, COLSA bid farewell to 21 beloved members of our community, most of whom had been at the college for decades.

"Every research project we initiate, every degree we grant, every activity we undertake is powered by our dynamic staff and faculty," says Dean **Anthony S. Davis**. "We appreciate the contributions that these retirees made to our community."

John Aber, professor

Wendy Beagen, technical education specialist

Charlie Caramihalis, professor

Judy Chick, senior business services assistant

Thomas Davis, professor

Kenneth Flesher, professor

James Haney, professor

Brenda Hess-McAskill, farm manager

Theodore Howard, former associate dean of COLSA and professor

Diane Lavalliere, senior program support assistant

Cynthia Lewis, senior program support assistant

Mary Katherine Lockwood, clinical associate professor

Alberto Manalo, associate professor

Adele Marone, clinical associate professor

Tammy McGlone, senior grant accounting manager

Subhash Minocha, professor

John Palmer, farm manager

Pete Pekins, professor

Janet Poff, laboratory supervisor

Regina Smick-Attisano, former executive director of the Thompson School of Applied Science, associate professor and academic coordinator for the provost's office

Jon M. Wraith, former dean of COLSA and director of the NH Agricultural Experiment Station and professor

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DREAM (GREEN)HOUSE

Isobel Michaud '21G *(pictured above)* assesses stem and leaf growth of chrysanthemums in different potting mixes at the new addition to the Macfarlane Research Greenhouses.

The $2.58 million greenhouse expansion, which was funded by the NH Agricultural Experiment Station, added 6,800 square feet of new growing space and includes features that support more technically demanding research in areas such as food crop breeding, sustainable plant nutrition and development and biological pest control. The addition represents an approximately 43% increase in research-grade space.

Michaud is working with **Anissa Poleatewich**, assistant professor in the department of agriculture, nutrition, and food systems, on her work to develop greenhouse production systems best practices for using biopesticides without compromising yields.