



"The Northeast Agribusiness and Feed Alliance is proud to collaborate with PRO-DAIRY to bring relevant education and advocate together for the advancement of the dairy industry in the Northeast. Through the collaborations and services that PRO-DAIRY offers, the dairy industry in the Northeast will continue to improve sustainability through nutrient management, herd health, facility design, employee training, agronomic practices, and encourage the next generation of youth to be involved in agriculture."

– Jenny Mills
President, Northeast Agribusiness and Feed Alliance



Enhancing
New York's dairy industry
through education and
applied research
since 1988



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Cornell **CALS**
College of Agriculture and Life Sciences



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A message from the director

The Cornell CALS PRO-DAIRY program is proud of its vital role in leading education and applied research in support of New York's dairy industry. The past several years have been very challenging for much of the industry, but we remain optimistic that our dairy industry will continue to be resilient and remain critical to New York's economy, contributing to the strength of our country's food system. I am confident in the people who comprise New York's dairy industry and believe that their unique strengths and the strong partnerships within the industry are key to our future, and to the future of the families who make their livelihood by farming. The New York dairy industry has:

- Forward-looking farmers who have a proven-record of innovating and thriving amidst constant change
- An active and strong agribusiness sector
- A skilled team of Cornell Cooperative Extension specialists that surpasses any others in the country
- A talented PRO-DAIRY statewide specialist program that works in collaboration with other faculty programs at Cornell, the only Land-Grant University in the Ivy League with a clear mission to educate and support agricultural communities via programs that create new knowledge and new practices

The educational programming offered through PRO-DAIRY and the independent and collaborative applied research conducted by our specialists is top-notch. This report highlights the many ways that PRO-DAIRY serves as a valued resource for our dairy farm businesses. PRO-DAIRY hones the management skills of our dairy farm owners and managers, enhances the technical skills of dairy farm employees, and provides technical expertise to our state's dairy farms in many important areas including farm business management, environmental stewardship, forage and crop production, cow health and management, dairy farmstead planning, dairy systems engineering, and through youth development programs that enhance knowledge of careers in dairy and attracts the next generation. Additionally, our strong and productive partnerships with agribusiness and extension professionals helps all of us to grow and improve in support of the industry every day.

With many thanks for your continued support and partnership.



- Dr. Thomas R. Overton
Director, PRO-DAIRY



PRO-DAIRY's mission

Facilitate New York State economic development by increasing the competitiveness and sustainability of New York's dairy farm businesses through industry-applied research and educational programs that enhance farm profitability while advancing dairy producers and agribusiness professionals' knowledge, skills, and enthusiasm.

For 35 years PRO-DAIRY has dedicated itself to one goal: to foster a progressive New York State dairy industry through its programming and leadership. With results-driven education and research, PRO-DAIRY specialists have contributed to the technical knowledge, management skills, and economic strength of New York's dairy industry since 1988.

Progress

The dairy industry is not static, nor is PRO-DAIRY. As New York's dairy farms have changed over time, so has PRO-DAIRY. The program has added specialists, programs, and research that target industry areas and issues important to keeping New York dairies competitive in today's market-oriented environment. PRO-DAIRY features programs that span the industry, including climate leadership and environmental management; crop, manure and nutrient management; business performance; herd health and management; strategic farmstead planning; and youth education.

Profit

While looking forward to where New York's dairy industry must be to remain competitive, PRO-DAIRY attends to the basics of dairy business profitability. Through programs and research, it targets business management, cow care, nutrition, facilities, dairy replacements, and manure management, to name a few.

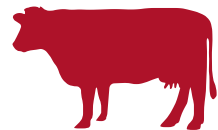
Partnerships

In today's business climate, partnerships are essential to success. PRO-DAIRY, a joint venture of the New York State Department of Agriculture and Markets and Cornell University's College of Agriculture and Life Sciences, has a long history of partnering with dairy organizations. Key collaborators include dairy producer groups, Cornell Cooperative Extension, and numerous agribusiness and state government agencies.

NY Dairy Stats



3,200 dairy farms
(2023, USDA/NASS)



630,000 cows
(Jan 2023, USDA/NASS)



5th nationally in milk production annually
(2023, USDA/NASS)



Over 15 billion pounds of milk annually
(2023, USDA/NASS)



\$4.1 billion in gross producer income in 2022
(2023, NYS AGM)

Our partners



"Thanks to the work of Cornell PRO-DAIRY, our farmers have access to the expertise and education that is needed to help them grow, modernize, and expand their operations. We are grateful for our long partnership with PRO-DAIRY and look forward to continued opportunities to collaborate and support their work to increase the competitiveness of our agricultural community."

– Richard Ball, State Agriculture Commissioner
New York State Department of Agriculture and Markets



"As New York's largest agricultural sector, the dairy industry is an integral segment of our state's economy, a major source of job creation in rural communities, and a critical partner in environmental stewardship. I'm proud to support the innovative efforts of Cornell's PRO-DAIRY program, which has a long history of elevating the needs of our hard-working dairy farmers and delivering the resources to help these majority small and family-owned businesses remain competitive."

– Senator Michelle Hinchey
Chair, Senate Agriculture Committee



"Given the challenges and opportunities facing the dairy industry, Cornell's PRO-DAIRY program provides access to the resources farmers need to be successful. From help dealing with the effects of climate change, to improving herd health, PRO-DAIRY is developing strategies to boost this important sector of our food economy. I'm happy to support a program that prioritizes the needs of New York's farmers who have made our state's dairy industry a national leader."

– Assemblywoman Donna Lupardo
Chair, Assembly Agriculture Committee



"For more than 30 years, PRO-DAIRY has evolved to meet the changing needs of New York state's dairy industry, driving innovation in this sector with a focus on sustainable, science-based solutions. In service of Cornell's Land-Grant mission, it has helped dairy businesses remain competitive by utilizing CALS' research applications, providing critical education and programming, and sustaining important dairy partnerships across the state. We are continuously grateful to collaborate with this organization, to keep New York dairy thriving."

– Benjamin Z. Houlton
Ronald P. Lynch Dean, Cornell College of Agriculture and Life Sciences



"PRO-DAIRY is a valuable resource to my family's farm and to dairies across the state. The staff's expertise and applied research provide essential services that help farmers make critical decisions that guide our environmental management, animal care, and business planning. New York Farm Bureau is a longtime supporter of PRO-DAIRY, and we will continue to advocate for its programs that truly make a difference for New York agriculture."

– David Fisher
President, New York Farm Bureau



"The Northeast Dairy Producers Association is a proud supporter and valued partner of the PRO-DAIRY team, who are leading the nation with the research and education that they provide to the dairy industry. Their impact is felt locally, nationally and worldwide. PRO-DAIRY's science-based research and education is critical to practical and economical solutions for farms that are needed to reach the industry's aggressive climate goals, and is paramount to ensuring a fiscally-sound industry. Whether it's animal welfare, on-farm efficiencies, or employee management and compliance, the PRO-DAIRY team has every angle covered."

– Keith Kimball
Chair, Northeast Dairy Producers Association



PRO-DAIRY programs are well-received by the dairy industry

Program	Approximate annual number of cows represented and attendance
Cornell Dairy Farm Business Summary and Analysis Program	146,132 cows, 122 farms (direct PRO-DAIRY contribution).
Dairy Profit Monitor (monthly benchmarking tool)	104 farms, representing over 127,000 cows, used this tool.
Operations Managers Conference	The 2023 Operations Managers Conference theme and topics focused on managing for consistency while leading through change. The biennial conference was attended by nearly 200 dairy producers and industry professionals from New York and the Northeast.
PRO-DAIRY Webinar Series and Podcasts	PRO-DAIRY podcasts tailored to dairy production management have been heard over 10,000 times. Topics focus on the latest dairy research and practical on-farm information for dairy farmers.
PRO-DAIRY Online Courses	Over 1,400 students (including dairy farmers, dairy farm employees, agribusiness professionals, and university personnel) have taken the five courses offered. Follow-up surveys indicate 90 percent of participants recommend the courses.
CAFO Road Show Programs	Delivered in person and virtually at seven locations across New York state to dairy farmers, their staff, contract haulers and their staff, with 459 individuals earning CAFO training credits.
New York State Corn Silage Hybrid Trials	2022 results were presented at meetings statewide as well as in webinar and article formats. Hybrid entries increased to 66 hybrids from 13 brands.
Herd Health and Nutrition Virtual Conference (with Northeast Agribusiness and Feed Alliance)	The annual conference was attended by nearly 150 industry professionals, representing much of the New York dairy industry.
Applied Agricultural Engineering Training	Continuing education workshop with 19 continuing education certificates given out for 7 training hours to participating agricultural engineers.
Northeast Dairy Management Conference (with Northeast Dairy Producers Association)	361 registrants (including dairy farmers and employees, agribusiness professionals, and university personnel), 111,543 cows.
Progressive Dairy Magazine	Circulation of the 16 page "The Manager" insert is more than 9,000 farms in the eastern US. Approximately 2,300 farms in New York receive it via the all-herds issue.

Dairy Farm Business Summary and Analysis
30 years of change

The Dairy Farm Business Summary & Analysis Project (DFBS) is one of the longest applied research efforts within the College of Agriculture and Life Sciences at Cornell University that interacts directly with rural stakeholders of the land grant mission. The DFBS started as a project in 1956 and works with dairy farm families to analyze financial and business performance over time, with the objective to improve business and financial management within the dairy industry using modern analysis techniques and historical farm data.

In 2002 DFBS was converted to a secure web-based system and farm data from 1993 forward is available online to individual participating farms. With completion of the 2022 year by participating farms, 30 years of data are now within the web-based system, covering the business years of 1993 through 2022. Recognizing this 30-year milestone is an opportunity to recognize the continued participation over time by dairy farm families across New York State. 38 farms statewide participated for both the 1993 and 2022 business years.

"Out of these 38 farms, 21 have participated every year since 1993, which is a testament of the importance these farm families place on participating in the DFBS and supporting this applied research and extension project at Cornell," said PRO-DAIRY Farm Business Management specialist Jason Karszes. "Many of these farms may also have participated before 1993 but records of individual farms participating before 1993 have been lost to time."

Ideal Dairy Farms, a six-generation, 3,400 cow, 4,500 acre-dairy in Washington County, is a long-time participant in the Dairy Farm Business Management Summary and other business education programming through PRO-DAIRY. The farm is operated by John Dickinson, his wife Denise, his daughter Crystal, and cousins Kyle and Luke Getty. Management is currently in transition to the three younger partners who continue to participate in Cornell dairy management programming.

"In 1981 my wife Denise and I started a dairy business milking 100 cows and recruited the local County Cooperative Extension educator to set us up with an accounting system for our

financial records," John said. "We also agreed to participate in the DFBS, not only to evaluate our profitability and returns on investment, but also to use the summary to benchmark our costs against other established businesses. Ever since, we have continued to use it as a financial analysis tool to measure our financial progress over time and to benchmark with similar sized businesses as we've grown."

"In the early years of PRO-DAIRY, DFBS was the basis for implementing strategic business planning, goal setting, and making informed financial decisions based on solid financial records and analysis," John said. "Establishing goals that were SMART – Specific, Measurable, Achievable, Relevant, and Time-based."

"Our participation in Cornell's DFBS program and subsequent financial management programs, including the Dairy Profit Monitor program, has been instrumental in evaluating our financial position to grow from a 100-cow dairy to a 3,000-cow dairy, today," John said. "Over the years the various Cornell staff members have been an influential resource to our farm business success."

John Dickinson



PRO-DAIRY Specialists



Jason Karszes is a Senior Extension Associate and specializes in dairy business management. His focus areas are in management education, financial analysis, decision making, budgeting, and business planning. Some of the programs he manages include: Dairy Farm Business Summary, discussion groups, and Activity Cost Analysis.



Mary Kate MacKenzie is a Business Management Specialist. Mary Kate received her MS in Applied Economics and Management from Cornell University in 2017. She works with dairy producers to improve record-keeping systems, analyze farm financial performance, and plan for the future.

When PRO-DAIRY was established over 30 years ago the focus was business. The Farm Business Management program area now impacts farms statewide and includes business analysis, discussion groups, and personal growth programming.

Dairy Farm Business Summary and Analysis Program (DFBS) is a 60-year-old education and applied research program administered by PRO-DAIRY. Farmers report their annual performance over a web-based system housed at Cornell and receive business analysis reports and comparisons for their dairy. This individualized information is used to monitor performance from year-to-year and to benchmark performance against other dairies. For the 2022 business year, PRO-DAIRY specialists worked directly with producers and extension and agricultural service professionals to conduct the DFBS with 131 New York dairy farms that represented a total of 164,000 cows. To date, 98 percent of farms that participated in the program in 2021 have completed the DFBS for 2022. DFBS data show the following industry trends:

- Average herd size increased by 2.6 percent
- Milk sold off the farm increased by 2.8 percent
- With a 2.2 percent increase in labor hours, labor efficiency only increased 0.6 percent
- Dairies completing the DFBS employed a total of 3,361 full-time worker equivalents (FTEs) in 2022, including owner/operators (417 FTEs) and hired employees (2,944 FTEs)
- Dairies completing the DFBS reinvested a total of \$239,730,000 into their farm businesses in 2022

With departures of farm extension educators statewide, PRO-DAIRY provided support to 20 farms that previously worked with extension educators to complete their DFBS. Reports and presentations using DFBS information were developed and presented at 20 meetings, with a focus on business management. Multiple progress reports and a six-year analysis were compiled.

Dairy Profit Monitor (DPM) is an online business trend analysis tool that provides a monthly snapshot of key operating parameters and efficiencies at the farm-level. It allows farmers to track progress and trends over time, assess impacts of management changes, and highlights potential areas of opportunity within the business. The program also allows farmers and their consultants to create a customized benchmark report for any month based on selected characteristics. The tool has the capacity to benchmark performance compared to individual farms with similar size, geographic area, and management practices.

In 2022, 106 dairies in New York, representing 146,254 cows, used the program's report generating capabilities.

Information from DPM is also used in business-focused discussion groups, on-farm dairy profit teams, farm management meetings, and case farm projects for college students. PRO-DAIRY staff presented educational programs using Dairy Profit Monitor information and decision-making to nine groups and published two extension fact sheets.

Activity Analysis Projects include surveys and development of cost calculators for key management areas. Projects for 2022 focused on costs of inputs, growing forages, and feeding activities.

- **Input Cost Survey** compared the average prices that farms pay for various farm input costs. 60 farms, representing 107,278 cows and 2,815,009,952 lbs. of milk participated.
- **Organic Forage Cost of Production** determined costs to grow organic forages. Nine farms, representing 978 cows, participated.
- **Load, Mix, and Deliver Feed** project was conducted at the request of a group of dairy farms. 18 farms, representing 15,269 cows, participated.

Dairy Profit Discussion Groups create space for farmers to share and discuss business performance data with peers. The Farm Business Management team supports 11 NY groups, with 10 to 14 farms per group, focused on business management education. The groups meet twice annually over a two-day period to tour member farms and other businesses, and to share and discuss business performance data. Participating farms use the Dairy Farm Business Summary, Dairy Profit Monitor, and Activity Analysis Projects to generate performance data that are consistent and comparable across farms. Facilitated peer-to-peer discussion help farmers understand links between management decisions and financial outcomes, and identify strengths and opportunities for improvement, within their businesses.

During the 2022 program year, PRO-DAIRY specialists directly facilitated 10 discussion groups and supported one additional group facilitated by agricultural service personnel, reaching 108 farms, representing 151,806 cows. With a return to in-person meetings, 85 percent of the farms attended meetings in person.

By combining peer-to-peer learning with detailed financial reports and professional facilitation, this discussion group model has tremendous potential to impact financial literacy and decision-making. When participating farmers were surveyed about the program, 100 percent of respondents indicated that they had made changes or improvements to some aspect of their business because of their participation. The business network that discussion group participants develop is a valued resource, as 97 percent of respondents report they stay in contact with other members of their group outside of formal meetings.

"It is not possible to put a dollar value on my participation in this group. I will say that when I started attending these meetings we were milking about half the cows that we are today. Production per cow per day is up 20 percent plus. Our cost of producing a unit of milk has decreased by 10 percent plus. Very valuable program."

– Dairy Profit Discussion Group participant

Farm Accounting with QuickBooks Online was offered in 2022 in collaboration with the CCE South Central NY Dairy and Field Crops Team. Not all farms have adequate financial records for benchmarking and business-planning. This five-week online course helps farm business managers improve recordkeeping systems and financial accounting skills. Course content includes articles, recorded videos, discussion forums, quizzes, and five live webinars. 27 farms enrolled, including six dairies.



PRO-DAIRY Specialist



Joe Lawrence is PRO-DAIRY's Dairy Forage Crop Production System Specialist and focuses on dairy forage systems management, drawing from his experience working with the NY dairy industry as a private sector certified crop advisor (CCA) and as a Field Crops Educator for Cornell Cooperative Extension. The forage systems program works to integrate agronomic management of forage crops with harvest and feeding practices to optimize use of forages in the dairy ration. Lawrence also leads a multi-disciplinary team to implement the annual Commercial Corn Silage Hybrid Evaluation program in New York and Vermont.

The PRO-DAIRY Forage Quality and Cropping Systems Program focuses on improving forage quality and land use on New York dairy farms to enhance economic and environmental outcomes. The program has built and continues to foster key collaborations with dairy producers, industry groups, university partners, agribusiness, and government organizations. The program addresses emerging needs of important practices, including harvest and storage management, double cropping, tillage and conservation to promote soil health, and hybrid/variety selection to optimize crop yield and quality.



Over 1,400 individuals directly interacted with the program, resulting in over 1,130 contact hours, in a mix of in person and virtual events, several of which are archived for future viewing. 300 farms, with 270,000 cows, producing 6.48 billion pounds of milk, were impacted.

COMMERCIAL CORN SILAGE HYBRID EVALUATION PROGRAM

The PRO-DAIRY led Corn Silage Hybrid Evaluation Program continues to build strong support with stakeholders and is ever-expanding as a platform for additional applied research. The program is leveraged to gain data on additional topics of importance, ranging from the impact of growing conditions on forage quality to the nitrogen use efficiency of corn silage hybrids. In 2023, the Hybrid Evaluation program served as a platform for a project that evaluated impact of soil health differences and crop performance, in collaboration with PRO-DAIRY colleague Kirsten Workman. With field trial locations across New York and in Vermont (in conjunction with UVM Extension), the program offers valuable information on the rapidly changing options related to corn hybrid selection, addressing both agronomic and nutritional aspects of corn silage to the dairy industry. Trial results continue to be presented at numerous programs and on recorded webinars. Work continues with regional partners (Northeast Corn Silage Hybrid Evaluation Consortium) to enhance the use of field data to:

- 1) Continually improve forage quality evaluation methods
- 2) Refine decision-making tools
- 3) Study the impact of weather events and overall growing conditions on hybrid performance across the region

RESPONDING TO GROWING CONDITIONS

Every growing season brings unique opportunities and challenges. However, in recent years more extreme variations, both within season and from one season to the next, have presented unprecedented challenges to produce high-quality forages. The forage systems program strives to react to these growing season conditions, and provide stakeholders with timely and targeted information on how to manage through these conditions, with an eye on optimizing forage quality.

The 2023 growing season delivered weather extremes across the state and PRO-DAIRY responded by releasing a number of timely articles on considerations for managing through these extremes.

MANAGEMENT OF FORAGE: HARVEST AND STORAGE

A key focus of the program continues to be the critical nature of forage harvest and storage management. These key areas have profound impacts on overall farm sustainability and profitability. Post-harvest degradation of quality and storage losses can be significant with impacts on animal health, production, economics, and the environment. With a combination of accepted best management practices, and the introduction of new data and concepts, this topic continues to garner great interest.

APPLIED RESEARCH AND EDUCATION

The program continues to expand the use of applied on-farm research collaborations to address questions and issues of importance to

successful management of forage. In addition to the Corn Silage Hybrid Evaluation Program, and auxiliary studies associated with these trials, the program continues to build collaborations and support other applied research in NYS. The program partners on a number of forage crop projects, ranging from monitoring important field crop pest, to studies focused on successfully integrating cover crops into forage crop rotations, and refining management strategies for hay crop forages.

With grant support from NY Farm Viability Institute, and in partnership with Miner Institute, a project was conducted over the 2022 and 2023 growing seasons addressing important stakeholder questions around the impact of planting and harvest timing on the performance and nutritional value of corn silage.

PRO-DAIRY's Forage Management Program actively educates through a PRO-DAIRY Forage Management online newsletter, Cooperative Extension newsletters, popular press publications (American Agriculturalist, DairyBusiness, Hay and Forage Grower, Hoards Dairy, Progressive Forage, and Progressive Dairy) and a number of email listservs and websites.

SOLAR AND LAND USE

Over the past few years, the program has engaged with Cornell and Cornell Cooperative Extension workgroups and industry partners to aid in better understanding the opportunities and potential forage land use impacts of commercial solar development in the state. Recently this effort has supported two widely attended webinar series and development of extension materials addressing land use and forage management considerations for efforts around agrivoltaic (the integration of agriculture within solar arrays).



PRO-DAIRY Specialist



Kirsten Workman is PRO-DAIRY's Nutrient Management and Environmental Sustainability Specialist. She draws on her agronomic and environmental training and over 20 years of extension experience working with farmers to help NY dairy farms improve the nutrient management and environmental sustainability of their farm businesses. She believes strongly that farming and environmental sustainability are inextricably connected and works hard to effectively communicate that to the public and policy makers in NY. Workman has an MS in Agronomy, is a Certified Crop Adviser, and serves as the Northeast/Mid-Atlantic Regional Editor of Crops & Soils magazine.

The PRO-DAIRY Nutrient Management and Environmental Sustainability Program provides educational programming and applied research with emphasis on optimizing crop yields, reducing fertilizer costs, accounting for manure nutrients, CAFO and nutrient management compliance, soil health, and the overall environmental sustainability of NY dairy farms. The program works in partnership with a diverse set of stakeholders to devise solutions for water quality, soil health, climate resiliency, policy and regulatory decisions, and public education.

Effectiveness of the program results in part because of close collaboration with the Cornell Nutrient Management Spear Program (NMSP) and active and extensive partnerships with many NY dairy farmers, NYS AEM Certified Nutrient Management Planners and other farm advisors, and state and federal agency staff at the United States Department of Agriculture – Natural Resources Conservation Service (NRCS), Soil and Water Conservation Districts (SWCD), NYS Department of Agriculture and Markets (NYSAGM), and NYS Department of Environmental Conservation (DEC).

TRAINING IN NUTRIENT MANAGEMENT

Education and outreach to farmers about careful timing and placement of manure application continues to be a critical effort as water quality remains a high priority for farmers and state agencies. Significant effort continues to be placed on the topics of timing of applications, and new technologies and equipment, to reduce manure runoff risk and maximize nutrient utilization of valuable manure nutrient resources.

With an updated CAFO permit effective January 2023, CAFO Manure Applicator Training was offered at seven statewide locations between December 2022 and March 2023, with 459 certificates issued.

The program is designed to reach farm staff custom manure applicators. It emphasizes safety, regulations, and the importance of following application rates, spreading setbacks, keeping records, and knowing how to respond to a spill or related emergency. Farm managers' report that after this training their staff ask more questions about setbacks and are overall more vigilant about potential manure-related risks.

In addition, PRO-DAIRY staff provided one-on-one consultations with NY AEM Certified Nutrient Management Planners to assist with effective implementation of the updated nitrogen guidelines, phosphorus index, and permit requirements. Formal training was also offered that covered broader topics applicable to planners and service providers, reaching more than 75 individual technical service providers at Conservation Skills Workshops and Certified Nutrient Management Planner trainings.

WATER QUALITY

Weather records show that NYS is facing increasing annual rainfall and storm intensity. These conditions make it harder to keep soil and nutrients on crop fields, reducing farm productivity, and increasing the risk for runoff and water quality challenges. As a result, the general public is increasingly interested in how farmers manage manure. As the interface with the public becomes more active, more time is spent by PRO-DAIRY staff in partnership with an industry Dairy Issues Team to develop community outreach materials and offer meetings to educate agency staff, local officials, and neighbors about farming and nutrient management topics.

2023 efforts in the Owasco Lake watershed focused on proposed updated watershed rules and regulations and a newly approved Nine Element Plan (9EP) led by environmental and municipal organizations that have significant impacts on the agricultural community. 9EP is a clean water plan that details the specific water quality concerns of an individual watershed and a strategy to address these concerns. PRO-DAIRY participated in technical committee meetings and now serves on the Owasco 9EP Implementation Coordination Committee to help partners, including Owasco Lake Watershed Management Council, Owasco Watershed Lake Association, Cayuga County, Auburn and Owasco cities, local farmers, CCE, and SWCD implement strategies outlined in the 9EP in way that is effective and practical. This work will impact Owasco Lake, the surrounding Finger Lakes, and beyond.

NUTRIENT MANAGEMENT SPEAR PROGRAM

Core nutrient management programming efforts are highly integrated with the extension and research efforts of the Nutrient Management Spear Program (NMSP) at Cornell in a strong and productive partnership to develop and interpret soil fertility research data from commercial and research farms for the benefit of NY's dairy industry.

In 2022/2023 several of the fertility guidelines for field crops were updated including the Nitrogen Guidelines, Phosphorus Guidelines, Nitrogen Leaching Index, and Adaptive Nitrogen Management. Roughly one million acres are impacted by the nutrient guidelines. PRO-DAIRY continues to partner with NMSP

to deliver several sessions for the advanced Certified Crop Advisor CCA training. Most certified crop advisors in NYS attend these sessions to receive continuing education credits required to maintain certification. CCA programming annually reaches at least 200 planners, agency staff, fertilizer dealers, and other agriservice professionals.

PRO-DAIRY also collaborates with NMSP and agency partners to update the CNMP Guideline website that sets out the required elements of Cornell Guidelines necessary to meet the NRCS 590 nutrient management standard and NYS CAFO Permit.

APPLIED RESEARCH

Working with NY dairy farmers and NMSP, PRO-DAIRY identifies and explores questions related to manure and nutrient management, soil health, water and air quality, climate change mitigation and resiliency, and other agro-ecosystem topics. On-farm research is a priority to maintain applicability and identify practical and effective strategies that can be adopted by Northeast producers to increase environmental sustainability and improve farm profitability and management, and includes a number of projects:

- Value of manure
- New York on-farm research network
- Dairy soil water regeneration project (Dairy Net Zero)
- Dairy sustainability key performance indicators
- Whole farm nutrient balance and carbon footprint assessments
- Soil health and crop resiliency – NY corn silage hybrid evaluation program



PRO-DAIRY Specialists



Jason Oliver joined the PRO-DAIRY DES team as Dairy Environmental Systems Engineer and Senior Extension Associate in 2022. Oliver's expertise and research interests include the evaluation and development of practical technologies for the treatment of manure, emissions, effluents, and greenhouse gases from livestock facilities. He has conducted extensive on-farm applied research and worked collaboratively with industry stakeholders to address emerging issues and regulatory considerations, including water quality, odor and air quality, antimicrobial resistance, and climate change resiliency. Jason has a BS in Environmental Biology from SUNY-ESF, a MS in Ecology & Environmental Science from University of Maine, and a PhD in Biosystems Engineering from the University of Minnesota.



Peter Wright is a Professional Engineer and helps dairy farmers move toward sustainability environmentally, socially, and economically. His expertise is in manure systems and best management practices on the farmstead and in the fields. Peter has a BS and M Eng. degree from the agricultural engineering program at Cornell University in 1977 and 1978.

Lauren Ray is an Agricultural Sustainability and Energy Engineer and Senior Extension Associate with DES. Her experience in energy system research and development, energy generation project application and implementation on dairy farms, as well as industry, is critical as dairy farm manure management systems are called on for renewable natural gas and renewable electricity production. Her expertise includes greenhouse gas emission quantification, energy system economic analysis, and New York State climate and energy policy. Lauren has a BS in Mechanical and Aerospace Engineering from Cornell University and a MS in Mechanical Engineering from Georgia Institute of Technology.



Angela George is a Dairy Environmental Specialist. She has a strong background working with dairy farms, primarily in the areas of manure, financial analysis, and herd management. She coordinates DES research projects on greenhouse gas emissions associated with dairy manure systems and the utilization of renewable energy from dairy manure and other organic feedstocks. Angela has a BS in Animal Science from SUNY Cobleskill.



"The relationship our organization has with PRO-DAIRY Dairy Environmental Systems is very strong. Our entire sustainability program is enhanced by the PRO-DAIRY team. I consider them all trusted advisors in our quest to advance the best science possible."

– Owen Weikert
Sustainability Manager,
Cayuga Marketing and Cayuga Milk Ingredients

The PRO-DAIRY Dairy Environmental System (DES) program emphasis is on evaluation and application of dairy manure management and treatment systems that are environmentally sound, improve human and animal well-being, and are economically viable.

Our research and extension efforts can be organized into three main areas:

MANURE MANAGEMENT, TREATMENT, AND SAFETY

Staying current on manure handling, treatment, storage and application innovations is our core area of work.

This year our focus has been on separation systems and advanced secondary treatments that enhance and partition manure nutrients so they can be more carefully recycled to croplands. These efforts are in direct response to our dairy industry's keen interest in viable strategies to enhance their ability to precision manage manure nutrients. Core and federal funding are essential to this work.

MANURE TO ENERGY SYSTEMS

Anaerobic digestion and biogas utilization continues to be an active area of our work.

Recent focus has been on feasibility studies for dairy manure and food waste co-digestion, small scale digesters, centralized or multi-farm systems, and upgrading biogas to renewable natural gas. Work has also centered on evaluating biogas systems for leakage and advising on refurbishment plans. These efforts are intended to support NY's interest in expanding renewable energy projects and the organic landfill diversion law. Core funding was leveraged to secure grants from NYS Energy Research and Development, NYS Department of Environmental Conservation, Northern NY Agricultural Development Program, and NY Farm Viability Institute to support this work.

CLIMATE AND ENVIRONMENT

This is a growing area of work that encompasses air and water quality protection, greenhouse gas mitigation, and climate change resiliency. It includes the conditions both in and around animal and manure systems and facilities to enhance cow comfort, human health and safety, and environmental protection.

DES has substantially expanded its investigation of greenhouse gas and ammonia emissions associated with manure systems to improve inventorying and identify management or treatments that farms can utilize to mitigate emissions. Focus is on evaluating manure storage cover and flare systems, a promising climate smart technology. These efforts support the goals established by the NY Climate Leadership and Community Protection Act (CLCPA) and US dairy's 2050 environmental stewardship goal of GHG neutrality. Core and sponsored project funds include NYS Department of Agriculture and Markets, United States Department of Agriculture, Cornell Atkinson Center for Sustainability, Dairy Management Inc., Nestlé, The Nature Conservancy, and the Environmental Defense Fund.

COLLABORATION IS KEY!

Program effectiveness is bolstered through collaboration. The DES team works closely with PRO-DAIRY colleagues; Cornell faculty; state, national, and international researchers; and dairy industry leaders to ensure dairy farmers and their advisors are positioned to make informed business decisions that further individual farm and industry-wide growth and sustainability. DES also works closely with government agencies and Non-Government Organizations to inform decision-making and ensure programs and regulations are sensible and align with dairy sustainability goals.

DES research is conducted in partnership with NY commercial dairy farms to ensure relevancy to state and regional industries. DES also partners with county and regional Cornell Cooperative Extension, and agriservice and agribusiness entities, on projects, demonstrations, and trainings to enhance impact. Efforts to engage and educate the general public are central as DES aims to improve dairy literacy and facilitate unified progression towards sustainable dairy industry growth.

Future DES efforts will build on these areas, and work proactively on topics and issues of importance for farms, the dairy industry as a whole, and especially society, as the dairy industry needs societal engagement and education on how farms house and care for their cows and calves, manage their byproducts, and minimize their environmental footprint, while maximizing food-value output.

Economic feasibility of the co-digestion of manure and food waste

PRO-DAIRY conducted a case study research project, funded by the Northern New York Agricultural Development Program (NNYADP), that assessed the economic feasibility of co-digestion of dairy manure and food waste to produce energy.

Anaerobic digestion and co-digestion are systems that can be used to help achieve the US dairy industry's goal to be carbon neutral by 2050. A 2022 NY law requires food waste producers of more than two tons per week to divert that waste from landfills if options are available within 25 miles for fees not exceeding 10 percent above the landfill tipping rate.

"The research done by Lauren Ray and other researchers with funding from NNYADP, is very beneficial to North Country Agriculture," said Jon Rulfs, co-chair of NNYADP and owner of Adirondack Farms, in Peru, NY. "Through manure digestion, we can be part of the solution in our nation's response to climate change. Through this research, we are working to bring carbon-neutral farming to our region and the state. We are very grateful for the support from Assemblyman Billy Jones for helping to secure funding for the program."

Project case study documents described two scenarios for a farm with 1,860 lactating cow equivalents:

- Scenario one analyzed use of the farm's existing anaerobic digester to electricity system processing its manure to take in a local source of cheese whey in a ratio of 20 percent by volume in the digester.
- Scenario two analyzed the economic feasibility of installing a new anaerobic co-digestion to renewable natural gas (RNG) system capable of taking in 50 percent by volume of mixed food waste from local food and beverage manufacturers with the dairy's manure.

The study found that co-digestion systems are economically feasible and a good investment with the 30 percent federal investment tax credit and the ability to sell renewable natural gas to a third party. PRO-DAIRY also reported that electricity generation and revenue continue to be a challenge in NY due to low export value and grid capacity limitations, which could lead to substantial upgrade costs for co-digestion systems. A webinar recording available on PRO-DAIRY's website overviews the research.



Lauren Ray, PRO-DAIRY Dairy Environmental Systems specialist, Shane St. Cyr, herd manager at Adirondack Farms and Assemblyman Billy Jones answer questions from media. Courtesy Photo from a release by The Office of Assemblyman Billy Jones (D-Chateaugay Lake).

PRO-DAIRY Specialist



Karl Czymmek is PRO-DAIRY's Dairy Climate Leadership Specialist. In this newly created position, Czymmek will have statewide responsibilities in climate leadership and greenhouse gas reduction strategies for the dairy industry, contributing to New York state's overall goals for greenhouse gas reduction.

As a Dairy Climate Leadership specialist for PRO-DAIRY, Czymmek will focus on interactions, communication, and training for dairy producers and industry advisors, scientists, governmental and regulatory agencies to improve sustainability by helping the dairy industry find economical ways to improve practices while protecting the environment.

Key areas of focus include soil management and carbon sequestration, enteric methane reduction strategies, and manure management

strategies, with the goal of reducing greenhouse gas emissions and developing economically favorable solutions for dairy producers.

Czymmek has a strong background in production agriculture and training in agronomy and law. He served the NY dairy industry for over 20 years as a PRO-DAIRY nutrient management specialist, where he focused on nutrient management, environmental, and other regulatory issues of importance to the NY dairy industry.

In 2021 Czymmek left PRO-DAIRY to work on the Environmental Research team at Dairy Management Inc, and then with Land O'Lakes subsidiary Truterra, on the Dairy and Livestock Services team. Both positions worked with the dairy industry in support of environmental stewardship goals established by the Innovation Center for US dairy, including greenhouse gas emissions.

"I am delighted that Karl is coming onboard in this new role," said PRO-DAIRY Director Dr. Thomas Overton. "He brings extensive expertise and experience with the New York dairy industry and is returning to NYS after working on carbon and climate related issues at the national level."



PRO-DAIRY Specialist



Caroline Potter is the Dairy Advancement Program Coordinator and works closely with the PRO-DAIRY Director and Specialists to develop and coordinate specific initiatives

within PRO-DAIRY. She is an experienced professional who has served in key leadership positions in the dairy industry. She earned her Associates Degree in Agricultural Economics from SUNY Cobleskill and her BS in Agricultural Economics from Cornell University.

The Dairy Advancement Program (DAP) (previously known as the Dairy Acceleration Program), in partnership with the New York State Department of Agriculture and Markets and the New York State Department of Environmental Conservation, is designed to assist New York dairy farmers to position their farm for long-term economic and environmental sustainability. Since its inception in 2013 nearly 1,050 dairy projects have been awarded funding, focused on small and mid-size farms across NY.

DAP funds development of business plans, implementation of record-keeping systems, improvements in human resource management processes, and development of peer-to-peer strategic focus groups for strategic planning and to enhance business profitability. Business plans have assisted owners with making sound business decisions for their dairies. DAP projects have analyzed options to enhance

profitability and modernize facilities, from replacing an aging parlor with robotics, to building a brand-new facility. Many are also exploring diversification, transitioning management or joining forces with a new business partner.

Since the inception of DAP, more than \$30 million has been reinvested in dairy production facilities, as a result of these projects.

DAP funds have facilitated development of comprehensive nutrient management plans (CNMP) and engineering of best management practices for continuous improvement in environmental stewardship in more than 700 dairy farm projects. Since the inception of DAP, nearly 90 farm projects have implemented a best practice (e.g. waste storage) on their farm. Through implementation of CNMPs, farmers create nutrient management plans that identify best management practices to optimize water quality around the farmstead. Farmers using DAP funds for CNMPs say the plan has maximized nutrient use, reduced cost of fertilizer inputs, and timed nutrient application to planting of crops. Several farms have used DAP funds in conjunction with other sources of funds such as the Environmental Quality Incentives Program (EQIP) or Ag Nonpoint Source (AgNPS) funds, to facilitate implementation of the farm CNMP.

DAP is coordinated through Cornell PRO-DAIRY and delivered to farms in partnership with Cornell Cooperative Extension and agriservice professionals.

More than 50 professionals assist with DAP projects, including extension educators, farm business consultants, facility planning professionals, AEM certified planners, and professional engineers.

Photo credit: Kevin Keenan

Dairy Advancement Program supports business and environmental sustainability

With financial and facility planning resources through a Dairy Advancement Program grant, Vaill Bros. Farm in Oneida County are positioning themselves for the future. Meghan Matt, a second-generation farmer, in partnership with her father Milton Vaill, hired Farm Credit East and Scotch Hill Solutions, Inc. to evaluate their 600-cow dairy. Focus of the evaluation was on facility upgrades to become more labor efficient.

"As the next generation becomes more involved in managing the farm, it's important for us to position our facilities and labor structure for the future," Matt said.

The farm family has a dedicated team, including Matt's husband Anthony, and several long-term employees who will help continue the farm's legacy.

"Vaill Bros. is a great fit for DAP because like many NY dairy farms it is multi-generational and successful. However, they are at a crossroads with the need for tremendous recapitalization of facilities," said Jeff Ainslie, owner of Scotch Hill Solutions, Inc., an architectural and engineering firm with a focus on dairy facility planning and consultation.

One of the values of DAP is a third-party, objective overview that can critically evaluate the long-term impact of decisions, and whether to move forward on a project or in a different direction.

"DAP has probably done more good by helping people make good decisions that were never seen," Ainslie said, "The overpriced parlor that was not built, the decision to not purchase that satellite dairy, the coaching to get a farm transition plan figured out before building a new barn."

A thorough, information-driven process has helped leadership at Vaill Bros. feel comfortable with planning next steps. "It helps us feel more secure in our decision with how to proceed," Matt said.

"In the current environment, with high construction and facility costs, and rising interest rates, they definitely are benefiting

from having various resources help them evaluate these capital budgets and the returns," Ainslie said. "There is more at risk today than ever on these projects and having a team behind every dairy to really do the detailed analysis is critical."

"From day one I sensed a level of comfort from Meghan and her family that they were working with a team that was looking at this objectively and only from their best interests," Ainslie said. "We are still in the planning and decision-making process on this farm with more work to do. We've had a lot of ideas on the table at Vaill Bros that we have set to the side as we whittled down to the most viable scenarios that we are currently focused on."

"DAP made it possible for us to explore our options thoughtfully with professional insight from financial consultants and facility engineers," Matt said. "We are eager to pursue our plans over the next one to two years."

Meghan Matt and her son Cooper



Farmstead strategic planning

PRO-DAIRY Specialist



Tim Terry works statewide with Cornell Cooperative Extension (CCE) educators and agribusiness professionals to enhance farm-level economic and environmentally sustainable growth. Terry draws from a solid educational foundation that includes undergraduate and graduate degrees in dairy management and nutrition and an engineering degree. This is tempered by over 35 years of practical experience successfully managing university and commercial dairies, providing nutritional services, and designing and inspecting agricultural structures and CAFO best management practices.

Farmstead Strategic Planning focuses on farmstead layout, facility and ventilation system design, and environmental planning to help farms maintain profitability and implement comprehensive nutrient management plans for environmental sustainability. Projects ranged from upgrading freestalls to designing milking centers and farm shops. This position is supported by the New York State Department of Agriculture and Markets and the Dairy Advancement Program.

DIRECT OUTREACH

Over the last two years, Terry worked statewide with 110 farms, ranging in size from 20 to 2,500 cows, in the areas of farmstead development and facility planning.

FACILITY DESIGN

Many projects were planned: calf barns (10), new or upgraded ventilation systems (30), new or upgraded freestalls and pack barns (22), farmstead development plans (9), milking centers (3), feed centers (6), farm shops (1). These plans were used to determine feasibility and to budget project costs. Some projects were delayed or scaled back due to costs.

COLLABORATION

The Farmstead Strategic Planning Specialist provided technical support to 97 CCE colleagues and other agribusiness personnel. Zoom conferences were hosted with CCE specialists where problems, projects, and success stories were shared to foster growth and learning.

EDUCATION AND OUTREACH

A course on calf barn housing and ventilation was developed and delivered to five NYC watershed engineers, six Delaware County Soil and Water Conservation District planners, and four CCE specialists. In addition, 19 webinars and workshops were conducted and attended by nearly 870 people from around the world. Topics included calf facilities, ventilation systems, retrofitting old facilities with new technologies, and managing snow loads on greenhouse-style structures. Tips for retrofitting and managing robotic milking systems were offered to 300 attendees of the Southwest Texas Dairy Days. Fact sheets were developed on robotic milking systems and tower silo safety. Terry also serves as a mentor for the Northeast and National Dairy Challenges and provides information and guidance on facilities and farmstead development.

IMPACTS

As a result of guidance provided by the Farmstead Strategic Specialist:

- One WNY farm rerouted farm lanes to an adjacent road to allow the dry bean enterprise to expand and increase receiving, processing, and shipping capabilities without conflicting with the daily activities and progress of the dairy enterprise.
- On another NY farm, a recommended change in freestall maintenance protocols resulted in decreased sand bedding usage and labor while also increasing cow comfort.
- Redesigned calf barn ventilation systems on two farms decreased incidence and morbidity of respiratory illnesses, reduced mortalities from seven percent to zero percent, and a greater than 50 percent reduction in lung consolidation as measured by ultrasonography.
- Redesign of a large CAFO's watering system eliminated the need to haul water and maintained production through the summer heat. The farm estimated the combined savings was over \$1,000 per day.



Student internships



Cornell CALS PRO-DAIRY initiated a new student internship program in 2022 with support from the New York State Department of Environmental Conservation and the Environmental Protection Fund. Paid internship opportunities were offered in Environmental Planning, Dairy Environmental Systems Engineering, and Agricultural Engineering. Students gained experience and exposure to key future job opportunities in agriculture.

ENVIRONMENTAL PLANNING INTERNSHIP

Interns worked with an Agricultural Environmental Management (AEM) Certified Planner to support environmental stewardship of farms in New York, while learning about the process, skills, and knowledge needed in an environmental planning role.

Certified planners work with farmers to develop Comprehensive Nutrient Management Plans (CNMP) that identify soil characteristics, prescribe application of nutrients to cropland, suggest conservation practices that maximize soil health for optimal crop production, maintain compliance with state laws, and promote environmental sustainability for water, soil, air, and climate.

2023 student interns included: Megan Guy, Carolyn Bass, Sophia Woodis, and Luke Duby.



Corrine Brown, a 2023 Cornell graduate in Agricultural Sciences, interned in 2022 as a crop scout for Western New York Crop Management Association. She scouted corn, soybean, alfalfa, and snap bean fields for pests and disease, taking population counts, and observing the overall health of the crop. She also collected data and ran the Cornell Nutrient Mass Balance software for dairy farms. The hands-on, applied aspects of the internship helped solidify her interest in agronomy and nutrient management within the industry as a viable career path and she now works as an analyst for dairy sustainability research and initiatives for Newtrient LLC.

DAIRY ENVIRONMENTAL SYSTEMS (DES) ENGINEERING INTERNSHIP

Interns gained applied experience working with an engineer and contributing to environmental stewardship of dairy farms in New York

while learning about the process, skills, and knowledge needed in the field of agricultural engineering.

Activities included on-farm data collection and data analysis of waste management and treatment systems; air emissions modeling; strategic farmstead planning; drafting technical reports; and participating in Professional Engineering training. Interns worked with agricultural producers and interfaced with the producer's agricultural engineer to implement their assignments.

The 2023 Dairy Environmental Systems intern was Aidan Lane. Aidan is a rising senior in the Cornell College of Engineering. He worked with PRO-DAIRY to develop a model to estimate the biogas production from anaerobic digesters and quantify their economic costs and benefits.



AGRICULTURAL ENGINEERING INTERNSHIP

Interns assisted an engineer with development and implementation of projects, including construction inspections and as built surveys, and gained experience in survey and data collection, CAD drawing, and drafting reports.

Licensed engineers work with farms to design structural improvements which must meet specific standards. Their work focuses on soil erosion control, waste management, and runoff management, to improve water quality around the farmstead. Additionally, engineers may also work with farms to design housing, milking facilities, youngstock housing, and other necessary facilities for livestock on the farm.

The 2023 Agriculture Engineering was Jackson Slade.

Madison McCall was the 2022 Agriculture Engineering intern. She is a senior, majoring in civil engineering at Clarkson University. She conducted farmstead and topographic surveys to create engineering site plans on farms. The hands-on, applied aspects of the internship, and the field trips confirmed her career interest in agricultural engineering.



PRO-DAIRY Specialist



Debbie Grusenmeyer is a Senior Extension Associate in the College of Agriculture and Life Sciences, in addition to being part of PRO-DAIRY and the Dairy Management Group for over 25 years.

She provides leadership for developing, coordinating, and implementing the NY dairy youth programs, which includes state level 4-H dairy programs, Dairy Discovery, and the dairy track of Animal Crackers. She is also the Director of the NY Junior DAIRY LEADER Program and the statewide Beginning DAIRY LEADER Program.

Mentoring dairy youth has been a flagship program area since the inception of PRO-DAIRY and is critical to build the next generation of farm owners and managers. The cornerstone of the program is the **Junior DAIRY LEADER Program**. Participation is highly competitive and 30 selected youth, ages 16 to 19, build enthusiasm for the dairy industry through a year of experiential learning. Personal and professional leadership is developed in a networking environment where the diversity of career options in agriculture are discovered.

Over the past 25 years, 98 percent of the over 550 Junior DAIRY LEADER graduates attend college, and many choose to study agriculture. Prior to participation, over half indicated that they were not planning to study agriculture, or, they were undecided.

With the success of Junior DAIRY LEADERS and the increasingly competitive entry, the **Beginning DAIRY LEADER Program** was added in 2015. This program targets high school students entering at least their sophomore year, but who have not graduated, and includes four one to two-day workshops to explore postsecondary agricultural education and career opportunities in a networking environment with faculty, students and industry professionals, along with college planning and personal development.

Other key programs include:

- **Dairy Cattle Quiz Bowl**, a Jeopardy-like activity that attracts 400 youth yearly.
- **Dairy Discovery**, an annual hands-on workshop held at Cornell University, that attracts nearly 100 14 to 19 year-olds to learn about dairy careers and dairy cattle production.
- **Animal Crackers**, an annual event for 9 to 13 year-olds to meet Cornell faculty and students, and learn about animal care, that attracts nearly 200 youth.
- **Traditional 4-H Dairy Youth Programs** provide learning opportunities for 9 to 19 year-olds through activities such as dairy judging, showing cattle and dairy quiz bowl, and attracts up to 400 youth.

Developing youth through Junior DAIRY LEADER

Enthusiasm was palpable at the Junior DAIRY LEADER Graduation, held in August 2023 on the Cornell campus at Morrison Hall. The day is a culmination of an intense year of hands-on learning, exposure to industry issues, networking, farm tours and travel, designed to push comfort zones and promote leadership growth. Entry into the program is competitive, with applications being a precursor to college applications that are the next step for many graduates.

"This is an amazing program that helps to really cultivate students, especially when they're leaving high school and finding what they want to do in the workforce," said 2023 graduate Kirsten Widrick. "You connect with other people who you'll have lifelong friendships with."

Led by PRO-DAIRY's Debbie Grusenmeyer, Junior DAIRY LEADER (JDL) has inspired over 550 youth, ages 16 to 19, for 24 years. The innovative program is designed to build critical enthusiasm for the industry and to develop the next generation of dairy leaders.

"Junior DAIRY LEADER graduation is a special place, people, and purpose. You have gone through a life changing experience and I commend you," said John Clark, parent of a previous JDL graduate, and past president of Northeast Agribusiness and Feed Alliance, a sponsor of JDL.

Students participate in on-farm production analysis, develop resumes for internship opportunities, enhance teamwork, communication and problem-solving skills, prepare public presentations, and participate in farm tours and regional seminars.

"If you want to stay in ag, there's a million different fields you can go into, and a bunch of opportunities that not only need you but also want you," said participant Isaac Folts. "I think if you're nervous, just apply and give it a shot. You will have fun and you'll see a lot of new things, interact with amazing people, and have opportunities down the road."

The program kicks off in fall with a trip to tour dairies in Wisconsin and attend the National 4-H dairy conference. Many of the participants meet for the first time in the airport as they prepare to leave for the trip.

"Debbie's been wonderful. She's done this for so long, she knows how to treat the students with a caring attitude, while also giving them the independence to become who they are and explore new things," said Kirsten's mom Alison Widrick, Chaumont, NY. "It was a great growing experience for them."

In eight more programs over the year participants learn about and develop technical production management skills, are exposed to career opportunities, and build tools to make positive contributions to the industry. All with the goal of developing a growth mindset and positive impact on the dairy industry.

"The program allows so many opportunities that they wouldn't have if they were just on the farm. It exposes them to other farms," said Isaac's mom Ginny Folts, North Collins, NY. "We have a smaller farm and milk about 120 cows. Isaac has come back with so many different things that he said, you know, I have an advantage through Junior DAIRY LEADER. I saw this, so should we try this? Just exposing them, whether you stay on the farm or you learn about other careers in the industry, it's just a really great opportunity for them."

The need to attract high-caliber youth to the dairy field is frequently identified as a top priority by farm owners and JDL engages youth with careers in the dairy industry and inspires their educational choices. 98 percent of Junior DAIRY LEADER graduates continue their education beyond high school. Notable is that 84 percent of these youth choose agriculture, while prior to participation 53 percent indicated that they had not planned to pursue agricultural careers or had been undecided.

"I think Junior DAIRY LEADER is a great way for youth to meet others who share their interests," said Kirsten's mom Alison Widrick. "It helped her grow and become more self-assured and positive by meeting people her age and realizing that she is not alone in her love for dairy cows and farming. She saw there are many people who support the dairy industry. JDL also allowed her to see many different aspects of agriculture which opened up new opportunities for her future. Growing up on a dairy farm we don't always see other parts of the industry and this gave her a glimpse into what else was out there, which was extremely valuable as she considers college and career choices."



PRO-DAIRY Specialist



Robert Lynch, DVM, is a Dairy Herd Health and Management Specialist. Prior to joining PRO-DAIRY Lynch served as a senior industry veterinarian, where he provided technical support to dairies across the Northeast US, and was a managing partner an animal hospital in PA. His areas of expertise include transition cow health, milk quality, reproduction, replacement management, genomics, housing, lameness prevention, immunology, obstetrics, and neonatal care.

The PRO-DAIRY Herd Health and Management Program supports New York State dairy producers by leading educational programs, integrating research results, identifying research needs, collaborating on-farm with advisors, and participating in industry-wide initiatives. Current areas of focus include fresh cow management, prudent use of medications, calf health, and reproductive management.

Dr. Lynch serves as a resource to the industry and has also worked with multiple dairy farms, their veterinarians, and other advisors on specific health and productivity-related issues. This work was conducted in-person and virtually.

PROGRAMMING

The Herd Health and Management Specialist is engaged with a number of educational program development planning committees and continues to expand online course offerings in conjunction with Kathy Barrett, Dairy Production Management Specialist.

Northeast Dairy Production Medicine Symposium:

The 2023 Symposium was held in Syracuse with about 100 veterinarians in attendance. Attendees received 16 hours of veterinary continuing education credits and 95 percent of those who completed the evaluation indicated the event was good or outstanding.

Summer Dairy Institute (SDI): SDI is an advanced training program for prospective dairy veterinarians. The 2022 program was returned to its original six-week format and had 27 participants from around the US and other countries. Dr. Lynch is a member of board of directors, lecturer, and case farm group leader.

PARTNERSHIPS

PRO-DAIRY's Herd Health Specialist is also poised to engage on the state and national level with dairy herd health issues, and actively works with, and is a member of the American Association of Bovine Practitioners and the American Association of Bovine Practitioners Committee on Pharmaceutical and Biologic Issues, the NYS Beef Quality Assurance Committee, the Northeast Dairy Producers Association Animal Well Being Work Group, the Northeast Agribusiness and Feed Alliance Planning Committee, Cornell Cooperative Extension (CCE) Regional Dairy Specialists Animal Welfare Discussion Group, CCE Land-Grant COVID-19 Coordination Meetings, CCE Mentor Committees, and the Dairy Advisory Committee for the NWN Dairy, Livestock and Field Crops Team. He is also a Director Co-Chair of the Northeast Dairy Production Medicine Symposium and served as official veterinarian of the NY Animal Agriculture Coalition's Dairy Cow Birthing Center at the Great New York State Fair.

ISSUE AWARENESS AND EDUCATION

PRO-DAIRY is engaged with increasing the dairy industry's understanding of emerging current issues, including the 2017 Food and Drug Administration's Veterinary Feed Directive rule changes about judicious use of medically important antimicrobial drugs. Improved understanding of appropriate antibiotic use in food producing animals improves animal health and reduces residue risk. Another key emerging area is process verification, which improves day-to-day execution of management's protocols, and provides validation of good health standards.

- **FDA Training Program:** Assisted FDA representatives, who recorded training videos at the Cornell University Research Dairy and Dairy Teaching Barn, for field agents responsible for conducting farm residue investigations.
- **Futures in Veterinary Medicine:** Presented "Futures in Veterinary Medicine" to first-year college veterinary medicine students with an interest in animal production agriculture.
- **NY Beef Cattle Veterinary Practice:** Presented to the Cornell University College of Veterinary Medicine, American Association of Bovine Practitioners Student Chapter, and toured Maple Acres Beef Farm.
- **Mid Atlantic Consortium of Dairy and Beef Extension Specialists (MAC):** Presented "FDA CVM GFI #263", which shifts the remaining over-the-counter livestock antibiotics to prescription status, at the MAC Conference to about 25 extension educators.

HANDS-ON CALVING WORKSHOPS

PRO-DAIRY has a new calf model to bring hand-on learning to life that helps train farmers and extension professionals on how to conduct proper calvings and handle dystocia. The model was used at the CCE inservice to train 15 educators. It was also used in a series of eight calving workshops held statewide in collaborations with regional CCE dairy specialists. The workshop was offered simultaneously in English and Spanish to provide hands-on calving training to farm workers. By utilizing PRO-DAIRY's dystocia model, students were able to work through multiple calving scenarios. Registration was limited to allow students time to work with the model, but demand was high. 100 students from 40 farms, which represented

approximately 41,000 cows, participated. Initial feedback was positive and several more calving workshops are planned. Three months after a workshop, a farmer who had sent two employees spoke highly of the program to an extension educator. He said his employees thanked him for sending them and that they had successfully applied what they learned during a hard calving on the farm. Another farm owner reported that his employees were able to handle a breech calf while in the past they would have had to call for help in the middle of the night. Dr. Lynch also facilitated a discussion group of calf managers from six neighboring farms and 12 employees in collaboration with CCE at Calf Summit 2023.



PRO-DAIRY Specialist



Kathy Barrett is a Senior Extension Associate with PRO-DAIRY. She draws on years of experience working directly with farmers through Cornell Cooperative Extension and a farmer-led board of directors. Her program focus is statewide dairy management programs, including providing leadership for dairy management education and coordinating statewide programs, including webinars, podcasts, and online courses.

Effective use of production management tools is a major barrier to profit and production growth of New York dairy farms, and impacts the profitability and quality of life for farm owners. Dairy Production Management education offers effective and accessible educational programs that reflect the diversity of geography and production management systems that characterize New York's dairy industry. The combination of cutting-edge research practices and tested best management practices enables farmers and their employees to make sound decisions for their farms and rural communities. A variety of methods and technologies are used to implement educational programs that develop the knowledge-base of farm owners and the agricultural workforce. This program collectively reaches over 8,000 farmers each year.

REGIONAL SHARED PROGRAMMING

To develop and implement programs, staff expertise is efficiently shared across the state.

- **Feeder School** was offered at eight sites statewide. This one-day program was presented on-farm in English and Spanish and reached 98 farmers and farm employees.
- **Dairy Technology Tuesdays** seven-part webinar series addressed implementation of emerging technologies on dairy farms. 1,295 people attended the live webinars.
- **Hands-on Calving and Dystocia Workshop** was offered at eight statewide sites. Instruction was provided in English and Spanish, and reached over 80 farmers and farm employees.

Regionals shared programming reached nearly 900 farms and over 900 employees.

DAIRY MANAGEMENT WEBINAR AND PODCAST SERIES

PRO-DAIRY regularly offers webinars and podcasts in English and Spanish. Topics focus on the latest dairy research and practical on-farm information for dairy producers. Webinars are recorded and available for viewing after the live presentation.

8,244 people were reached with the webinar series. 1,826 people were reached with the podcast series.

DAIRY MANAGEMENT ONLINE COURSES

Workforce development is crucial to the success of the dairy industry and rural communities. Online courses, coordinated and administered by PRO-DAIRY, attract dairy employees, managers, owners, and allied industry professionals. The courses focus on enhancing dairy management skills by offering a flexible learning environment where students can complete learning assignments from home at times convenient for them.

- **Calf and Heifer Management Course** – Requires an understanding of physiology, nutrition, genetics, health, and housing. This course provides the science and practical aspects of calf and heifer management.
- **Transition Cow Course** – Offers those managing and/or working directly with cows during the transition period the knowledge needed to choose and implement practices that best serve the needs of the transition cow.
- **Milk Quality Course** – Provides students with the science and practical tools needed to manage and interact with cows to achieve high-quality milk for consumers.
- **Forage Management Course** – Focuses on practical information for day-to-day management and decision-making of forage crops, from crop selection to feed-out on a dairy farm. Joe Lawrence, PRO-DAIRY Forage Systems Specialist, provides leadership for this course.

Over 1,400 students have taken PRO-DAIRY's online courses.

AGRICULTURE, FOOD, AND ENVIRONMENTAL SYSTEMS IN-SERVICE

Inservice training teaches educators about the newest agricultural research, economic trends, and extension methods to impact the economic viability of the NY agriculture industry.

Nearly 300 agricultural educators attended a three-day in-service training.

PRO-DAIRY Specialist



Julie Berry is PRO-DAIRY's Communications Manager. She edits *The Manager*, published in a national dairy magazine, coordinates annual report, and promotes PRO-DAIRY's efforts. She is an experienced media professional, and has worked in extension, journalism, and marketing. She has a BS with honors in animal science from Cornell University and a MA in science writing from Johns Hopkins University.

Outreach and industry education are an important action of PRO-DAIRY and several avenues are used, including a 16-page *The Manager* insert in *Progressive Dairy*, a partnership established in 2018. Through a useful combination of research updates, on-farm practices, economic analysis, how-to's and action steps on every aspect of managing a dairy business, PRO-DAIRY uses *The Manager* to strengthen New York's dairy industry and as a key method for PRO-DAIRY staff to share their expertise statewide.

Circulation of Progressive Dairy, including The Manager insert, is more than 9,000 farms in the eastern US. Approximately 2,300 farms in New York receive it via the all-herds issue.

Timely news is delivered via e-Alerts and a monthly e-Leader newsletter to an email list of over 8,000 producers, agribusiness professionals, and legislators.

This list is also used for event, program, podcast, webinar, and forage management updates. PRO-DAIRY also regularly communicates with farmers and our partners through social media.

PRO-DAIRY ON THE WEB

PRO-DAIRY programs are highlighted on a redesigned website at cals.cornell.edu/pro-dairy

PRO-DAIRY specialists also work closely with Cornell dairy industry related programs including:

- Nutrient Management Spear Program: nmsp.cals.cornell.edu
- Cornell Field Crops: cals.cornell.edu/field-crops

PRO-DAIRY's website receives nearly 51,000 page views per year from over 21,000 users.

