



Enhancing
New York's Dairy Industry
through Education and
Applied Research
since 1988



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



*David Fisher, Mapleview Dairy owner operator,
Benjamin Houlton, Ronald P. Lynch Cornell CALS Dean,
and Thomas Overton, PRO-DAIRY director.*





A Message from the Director 2

PRO-DAIRY's Mission 3

PRO-DAIRY's Programs 4

Our Partners. 5

Farm Business Management6-7

Nutrient Management. 8-9

Forage Systems 10-11

Dairy Environmental Systems
& Dairy Sustainability 12-13

Dairy Advancement Program . . 14-15

Strategic Farmstead Planning16

Dairy Production Management . . .17

Dairy Herd Health
& Management. 18-19

Dairy Youth Programs 20

Dairy Industry
Communications21

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 attract 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



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 over 30 years PRO-DAIRY has dedicated itself to one goal: to foster a progressive New York State dairy industry through its programming and leadership. Through 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 environmental management; crop, manure and nutrient management; business performance; herd health and management; 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



3,650 dairy farms
(2020, USDA/NASS)



625,000 cows
(Jan 2021, USDA/NASS)



4th nationally in milk production annually
(2020, USDA/NASS)



15.3 billion pounds of milk annually
(2020, USDA/NASS)



\$2.6 billion (est.) in farm-gate milk revenue annually
(2020, NYS AGM)

PRO-DAIRY's Programs

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	137,300 cows, 112 farms (direct PRO-DAIRY contribution).
Dairy Profit Monitor (monthly benchmarking tool)	155 farms, representing nearly 115,000 cows, used this tool. An additional 22 farms representing 30,771 cows in other states also use the program.
Operations Managers Conference	Due to COVID-19 this biennial conference was held as a series of webinars over four weeks in early 2021. 150 participants attended from 10 countries, including 15 US states. The "Embracing Excellence" theme and topics were designed to assist farm management teams meet the challenges of today.
PRO-DAIRY Podcasts	PRO-DAIRY podcasts tailored to dairy production management have been heard by over 12,000 people.
PRO-DAIRY Online Courses	739 students (including dairy farmers, dairy farm employees, agriservice, and university personnel) took five courses. Follow up surveys indicate 90 percent would recommend the courses.
CAFO Off-Road Show Programs	Delivered virtually via webcast to 50 participants (dairy farmers/staff, contract haulers and their staff) representing 15,000 cows.
New York State Corn Silage Hybrid Trials	2020 results were shared at meetings statewide, in webinars and in articles. Hybrid entries and company participation was strong with 90 hybrids from 17 brands.
Herd Health and Nutrition Virtual Conference (with Northeast Agribusiness and Feed Alliance)	Virtual conference with 187 registered, primarily agribusiness professionals, representing much of the New York dairy industry.
CAFO Engineer Training Program	Continuing education workshops with 12 continuing education certificates given out for 7.3 training hours to participating engineers.
Northeast Dairy Management Webinar Series (with Northeast Dairy Producers Association)	Due to COVID-19, this conference originally scheduled for March 2020 was rescheduled and offered as a six-part webinar series in June and July 2020. 409 registrants (including dairy farmers and employees, agriservice, and university personnel), 176,930 cows.
Progressive Dairy Magazine	Circulation of the 16 page "The Manager" insert is 7,889 large herds (1,154 NY farms) in the East and 765 small herds in NY and VT. (Total circulation of 8,654.)

“Cornell’s PRO-DAIRY program is an incredibly valuable resource for our dairy farmers who are looking to expand their business. Today, our industry continues to face challenges, but also has many opportunities for growth. PRO-DAIRY provides the technical expertise and education to help New York’s farmers navigate all aspects of their operations, from critical business decisions and planning to herd health and animal care. We look forward to our continued partnership with PRO-DAIRY and supporting its work to increase the competitiveness of our farmers and position them for long-term success.”

– 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



“PRO-DAIRY has played a central role in bolstering New York’s dairy industry utilizing CALS’ cutting edge research and resources for more than thirty years. As the Land-Grant university for New York state, we are gratified to collaboratively advance our dairy industry’s technical knowledge, management skills and economic vitality.”

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



“PRO-DAIRY is very important to my family’s farm and dairies across New York State. Its programs use applied research to help us make better business decisions for the future as well improve environmental management and animal care. The work is integral to the growth of dairy farming in our state, and New York Farm Bureau values the strong partnership our organizations have built together to support agriculture.”

– David Fisher
President, New York Farm Bureau



“PRO-DAIRY is important to our members and the viability of the state’s dairy industry. The research and outreach education conducted by PRO-DAIRY staff in the area of environmental stewardship is critical for our member farms and serves as a model for many other states. We appreciate their quick response to emerging issues and timely research, reports, and outreach which supports the industry in identifying solutions for those issues. PRO-DAIRY’s leadership in helping farms network with each other through peer groups, discussion groups and the PRO-DAIRY Dairy Profit Monitor program promotes continuous improvement for participating farms. PRO-DAIRY, its staff and its programs continue to support the dairy industry’s success and progress.”

– John Dickinson
Chair, Northeast Dairy Producers Association

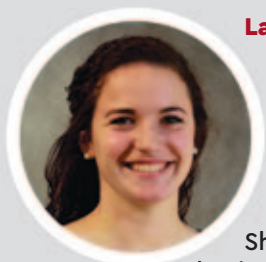


Farm Business Management

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: the Cornell Dairy Executive Program, Dairy Farm Business Summary, Discussion Groups and Activity Cost Analysis.



Lauren Hill is a Dairy Business Management Specialist. She graduated from Cornell University in 2017, and previously worked as the Operations Manager for a heifer raising facility. She assists in facilitating business discussion groups, activity cost analysis projects, the Dairy Farm Business Summary and coordinates the Dairy Profit Monitor Program.



Mary Kate MacKenzie has a shared appointment with the South Central NY Dairy and Field Crops Program (SCNYDFC). MacKenzie 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.

PRO-DAIRY was formed around a business management focus and the ground-breaking Managing for Success program. The Farm Business Management program area has evolved in how it impacts farms statewide and offers business analysis, discussion groups and personal growth programs, including:

Dairy Farm Business Summary and Analysis Program (DFBS), is a 60-year-old program, directed by Dr. Wayne Knoblauch and administered through PRO-DAIRY, that uses on-farm data over time to drive programming.

Farmers report their annual performance over a web-based system housed at Cornell and receive business analysis reports and comparisons for their dairy. Participants use this individualized information to monitor their performance from year-to-year and to benchmark their performance against other dairies. PRO-DAIRY plays a central role in collecting, analyzing and disseminating data. For the 2020 business year, PRO-DAIRY specialists worked directly, and with other extension and agriservice professionals, to conduct the DFBS with 112 New York dairy farms that represented a total of 137,300 cows. 97 percent of farms that participated in the program in 2019 have completed the DFBS for 2020.

- Average herd size increased by 4.1 percent
- Milk sold off the farms increased by 4.1 percent
- Labor hours increased by 1.6 percent, representing 41.1 additional full-time worker equivalents
- A total of 2,611 full time worker equivalents were directly employed in 2020
- \$124,441,623 was invested back into the businesses in 2020

Additionally, reports and presentations using DFBS information for business management were developed and presented at 38 different meetings for producers, students, and agriservice personnel. DFBS summary data is also used to develop case studies and to help train new farm management extension educators. A new publication that summarized multiple progress reports and a six-year analysis was also released. With the unprecedented events over the last year, additional data was collected, and new analyses were prepared to understand the impact of government programs and other industry responses to the COVID-19 crisis on farm performance.

Dairy Profit Discussion Groups, create space for farmers to meet to share and discuss business performance data. Participants indicate as a result they make changes to some aspect and improve their business, including increased income. The network they develop is a resource they value and maintain.

Statewide 13 Break-Thru Management Teams (B-Mats) focus on business management education and share performance data,

including the Dairy Farm Business Summary and the Dairy Profit Monitor data. In 2019, with support of the Dairy Advancement Program and in partnership with Cornell Cooperative Extension, a new group of 10 organic dairies was added. PRO-DAIRY specialists facilitate these business-focused group meetings, prepare reports and support additional groups facilitated by local Extension and agriservice personnel, including 129 farms representing over 167,000 cows. All of the participants surveyed in 2017 say they made a change or improvement to their business and 97 percent maintain the business relationships developed.

"It is valuable to benchmark against other top dairy farms of similar size and complexity. Also, the group has become very close so topics discussed outside of the formal meetings are very in depth about operations and problems. The complete trust and openness of the group in sharing and analyzing is invaluable."

Dairy Profit Monitor (DPM) was a natural next step from DFBS. DPM is an online business trend analysis tool that provides a monthly snapshot of key operating parameters and farm-level efficiencies. It provides a means for farmers to monitor their businesses in a more timely manner. Farmers can create customizable benchmark reports to track progress and trends, assess the impacts of management changes and highlight areas for improvement. The website was reprogrammed and the updated program was unveiled in 2020.

In 2020, 155 farms, representing nearly 115,000 cows, used this tool. An additional 22 farms representing 30,771 cows in other states also use the program.

Activity Analysis Projects are an outgrowth of the discussion groups and includes development of cost calculators for key management areas. Projects for 2019 to 2020 included collecting information on the feed-out process, manure removal from livestock housing, veterinarian and health costs, cost to raise dairy replacements, and Dairy Profit Monitor Supplemental Information. The results of these studies were used in nine producer meetings and two presentations. Projects for 2020 to 2021 focused on changes in hired labor costs on farms from the previous year and the cost to operate forage harvesters during corn harvest. The results of these studies were used in 10 producer meetings.

RESPONSE TO INDUSTRY CHANGE

In response to industry changes resulting from the pandemic and the resulting changes to milk marketing program, new virtual education programs for farmers were developed. New templates associated with over base pricing programs and budgeting tools along with updating costs of production benchmarks were undertaken. These materials were utilized in virtual educational programs with individual farms, consultants, extension educators, and agribusiness professionals to help improve decision making in response to changing circumstances.

Because of the concern of COVID-19 transmission, in person programs are temporarily on hold, including:

Cornell Dairy Executive Program (CDEP), a multi-session executive level management training program to improve business management skills over two one-week programs in a year. CDEP offers dairy producers and managers in related agribusiness opportunities to develop and strengthen skills in business management and leadership.

Academy for Dairy Executives was started in 2010 and targets the next generation of farm management and ownership. Curriculum includes "Managing with Finance" and "Managing with Success" topics and learning by networking with other participants in similar roles. Typically participants are the junior generation who return home to more effectively communicate and coordinate with senior farm owners.



Nutrient Management

PRO-DAIRY Specialist



Karl Czymmek uses his background in production agriculture and training in agronomy and law to work on nutrient management, environmental, and other regulatory issues of importance to the dairy industry.

A NOTE OF APPRECIATION

PRO-DAIRY celebrates and appreciates the significant contributions Karl Czymmek has made to the NYS dairy industry. After 20 plus years with PRO-DAIRY Czymmek joined the Environmental Research Team at Dairy Management Inc. where he works at the national level to support environmental stewardship goals established by the Innovation Center for US dairy.

“Working with the NYS dairy industry in my position with PRO-DAIRY has been incredibly fulfilling and rewarding. Over this time, I have had the privilege of working with many outstanding dairy farmers, researchers, agriservice and agency staff. Together we have helped the dairy industry grow stronger while reducing its environmental footprint,” Czymmek said. “There are many questions and challenges ahead. The resilience and problem solving skills of people involved in agriculture, especially dairy farmers, never ceases to amaze me. These skills will continue to be necessary in the coming years as we work to adjust to ongoing change. Thank you for the opportunity to serve the industry and the friendship and kindness you have shown me in return.”

The PRO-DAIRY Nutrient Management Program offers nutrient management educational programs with an emphasis on optimizing crop yields, reducing fertilizer costs, accounting for manure nutrients, identifying related environmental benefits and protecting water quality.

Effectiveness of the program results in part because of close collaboration with leadership and staff of the Cornell Nutrient Management Spear Program (NMSP) and active and extensive partnerships with many NY dairy farmers, 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), and NYS Departments of Agriculture and Markets (NYSAGM) and Environmental Conservation (DEC).

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 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 local officials and neighbors about farming and nutrient management topics. This effort continues in the Owasco and Cayuga Lake watersheds, with needs also surfacing in the Seneca Lake watershed as well as other parts of the state. Though the team suspended in person community outreach efforts in 2020, the group remains active and engaged.

General efforts during the 2020 COVID-19 pandemic year included field testing version 2.0 of the NY Phosphorus Index, online manure applicator training sessions, virtual certified crop advisor training and several work groups such as CAFO, Water Quality, Partners for a Healthy Watershed, Dairy Issues Team and Our Owasco.

PRO-DAIRY and Nutrient Management Spear Program (NMSP) leadership worked with agency partners to develop a comprehensive nutrient management plan (CNMP) guidelines for CNMP planners document including Cornell Guidelines necessary to meet the NRCS 590 nutrient management standard and both NYS CAFO Permits. Another significant effort included working with NMSP to develop an RFP and begin implementing a grant that will support five years of field research on a working dairy farm to track the impact of various treatments on crop yield, fertility response, soil greenhouse gas emissions and soil carbon sequestration.

Photo Credit to Kevin Keenan.

PRO-DAIRY welcomes Kirsten Workman as a Nutrient Management and Environmental Sustainability Specialist, beginning in January 2022.



Workman brings a depth of experience and a strong understanding of how farming and environmental sustainability are inextricably connected. Prior to joining PRO-DAIRY, she worked with farmers in Washington and Vermont for twenty years, helping them improve the nutrient management and environmental sustainability of their farm businesses. She has a BA in Environmental Studies from Pacific Lutheran University and a MS in Plant & Soil Science, Agronomy from the University of Vermont. Workman is an effective collaborator and has served on coalitions to devise solutions for water quality, soil health, climate resiliency, policy and regulatory decisions, and public education; an experienced educator and most recently served as a senior Agronomy Outreach Professional at the University of Vermont Extension; and has investigated, demonstrated techniques, and performed applied research to increase implementation of conservation practices on dairy farms. Her certifications include Certified Crop Advisor (American Society of Agronomy, Northeast Region CCA) and Vermont Certified Pesticide Applicator (Research & Demonstration and Agricultural-Plant).

"We are thrilled to welcome Kirsten to the PRO-DAIRY team. We think that she brings a great blend of knowledge and ability to work with farmers, agencies, and the public," said PRO-DAIRY director Tom Overton.

Forage Systems

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 program works to integrate agronomic management of forage crops with harvest and feeding practices to optimize the use of forages in the dairy ration. He leads a multi-disciplinary team to implement the annual Commercial Corn Silage Hybrid Evaluation program in NY and Vermont.

The PRO-DAIRY Forage Quality and Cropping Systems Program focuses on improving forage quality and land use on New York dairy and livestock 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 900 individuals directly interacted with the program resulting in over 530 contact hours, largely through online events due to the COVID- 19 pandemic, many of which were archived for future access.

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. 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 and 3) study the impact of weather events and overall growing conditions on hybrid performance across the region.

Joe Lawrence records data at a corn silage hybrid research site.



Photo Credit to Nicholle Gotham.

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. Our program strives to react to these growing season conditions, and provide stakeholders with timely and targeted information on how to manage through these condition, with an eye on optimizing forage quality. In addition to timely responses to season conditions, numerous educational materials focused on long-term management strategies to mitigate the threats of this variability have been, and continue to be, developed.

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, the 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 forages. 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 as a partner on a number of forage crop projects ranging from monitoring important field crop pest, to studies focused on refining alfalfa grass mixtures as high-quality forage, and understanding feed quality variation and sampling needs.

PRO-DAIRY's Forage Management Program actively educates with a variety of traditional and online communication strategies, including, but not limited to, in-person programs, webinars, online courses, a PRO-DAIRY Forage Management online newsletter, Cooperative Extension newsletters, popular press publications (American Agriculturalist, DairyBusiness, Hay and Forage Grower, Hoards Dairyman, Progressive Forage, and Progressive Dairy) and a number of email listservs and websites.

SOLAR AND LAND USE

Over the past year, the program has engaged with Cornell University, Cornell Cooperative Extension and affiliated organization workgroups to help better understand the opportunities and potential impacts of commercial solar development on agricultural lands in the state.



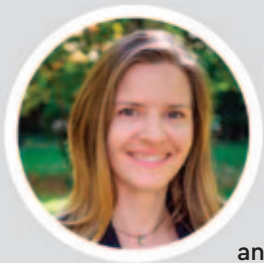
Dairy Environmental Systems & Dairy

PRO-DAIRY Specialists



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. He earned a BS and M. Eng degree from the agricultural engineering program at Cornell University in 1977 and 1978.



Lauren Ray is an engineer 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. Ray's expertise includes energy system economic analysis and New York State climate and energy policy. Ray has a BS in Mechanical and Aerospace Engineering from Cornell University and a MS in Mechanical Engineering from Georgia Institute of Technology.

The Cornell PRO-DAIRY Dairy Environmental System (DES) program came into existence in the early 2000's after an initial focus in 1998 on cow comfort and well-being and the resulting return on investments. In the early 2000's, the CAFO system was initiated and that, along with the need to educate on how to best manage sand-laden dairy manure, because many cows were bedded with sand to increase comfort, broadened the focus of the cow comfort/well-being program to the development and delivery of educational information on dairy cattle housing and dairy farm facilities.

Overall, the DES program team works closely with other specialists in PRO-DAIRY and appropriate NY, US, and international dairy

industry leaders to identify, develop, document, introduce and disseminate innovative methods in dairy housing and byproduct management systems targeted to enhance animal performance, animal well-being, system efficiency, environmental compliance and stewardship, and overall farm profitability. Efforts are accomplished with the goal of furthering individual farm and industry-wide growth and movement towards sustainability.

Program efforts are accomplished by conducting sponsored and self-funded industry-applied research with the objectives of furthering the understanding and development of dairy housing and waste management systems (with a current focus of anaerobic digestion) and by monitoring relative research and Extension work performed by nationwide and international counterparts.

Findings are disseminated by conducting on-farm trainings and demonstrations of new technologies and by developing and delivering written, oral, and web-based materials. Additionally, expertise is provided through educational programs offered by county and regional Cornell Cooperative Extension employees and agriservice and agribusiness entities.

Program initiatives have resulted in dairy producers and their advisors being better positioned to make informed business decisions in the areas of cow comfort/well-being, renewable energy, waste (nutrient) management/treatment, air emissions, and farm safety. Current work includes: documenting the greenhouse gas (GHG) reductions of various manure management strategies/treatments, improving anaerobic digestion tool to include co-digestion, informing the dairy industry of the opportunities and challenges of accepting food waste, working to optimize the function and economics of anaerobic digestion, and training engineers on the subtleties of working effectively with dairy farms. Impact indicators are testimonials from dairy producers and their advisors and observed changes in business behavior. At a US dairy industry level, impacts include providing specific information on key industry items to national industry leaders on greenhouse gas emissions, renewable energy, manure treatment systems, water use footprint, and overall dairy industry sustainability.

DES projects contributed to state and national sustainability goals. Greenhouse gas (GHG) emission work supports goals established by the NY Climate Leadership and Community Protection Act (CLCPA) and US dairy's 2050 environmental stewardship goal of carbon neutral or better. Further, the anaerobic digester refinement work and food waste projects contribute to the NY's organic landfill diversion law. The DES program is a strong collaborator with local, state, and federal agencies and the Innovation Center for US Dairy. Core dollars continue to be leveraged to receive grants from DOE-RAPID, DEC, and NYSERDA totaling \$2 million.

Future DES efforts will be to continue to work proactively on topics, issues and items of importance for farms, the dairy industry as a whole, and especially society, as the dairy industry needs society to be engaged and educated about how farms house and care for their cows and calves, how they manage their byproducts, and how they are working to minimize their environmental footprint while maximizing their food value output.

Clean renewable energy is produced by a Western NY farm's anaerobic digester, which uses manure from the farm's dairy cows as well as food waste collected from local grocery stores, restaurants, consumer food companies, universities, and schools.

Building on our ongoing theme of a system-oriented approach to solve industry challenges and materialize opportunities, the program will continue to broaden and build more depth to support maximizing the overall dairy food production system per unity of input. The DES program strives to work on topics in a way that helps position the industry to have a good future.



Successful screw press solid liquid separation system providing 60 percent dry matter solids for bedding from anaerobic digestate.



Dairy Advancement Program

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 820 dairy projects have been awarded funding, focused on small and mid-size farms across NY. An estimated \$25 million has been reinvested as a result of these projects.

DAP funds development of business plans, facility plans, and implementation of record-keeping systems 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.

DAP funds also support the development of strategic focus groups of dairy farmers with a specific area of shared interest amongst their

peers. The objective is to share experiences, data, and learning from each other to improve management, performance and profitability in a specific area of focus.

Five focus groups were formed, facilitated by CCE regional and county dairy specialists, with a minimum of seven farms in each group, for a total of 40 farms across all groups. Activity analysis projects for the groups included operational improvement, benchmarking costs for an organic group, impact of (and solutions for) labor regulations, calf management, and reduced antibiotic use in dry cows.

DAP funds also facilitate development of comprehensive nutrient management plans (CNMP) and engineering of best management practices for continuous improvement in environmental stewardship. Through development of CNMPs, farmers implement 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.

60 farm projects have used DAP funds to implement a best management practice identified in their farm CNMP. Of those 60 projects 45 were waste storages. 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 (PEs).



Dairy Advancement Program supports environmental and business sustainability

Sunset Young Farm, located near Cortland, NY is a fourth generation dairy farm operated by Ken and Sue Poole, Derek Poole, and Branden and Rebekah (Poole) Brown. In 2013 the family built a milk production facility to bottle milk from their farm's 130 cows and added a country store. Trinity Valley Country Store and Dairy sells locally produced products in their store and cream line milk and cheese curds across New York to stores including Wegmans and Tops.

After Branden completed the PRO-DAIRY Academy for Dairy Executives leadership course he recommended the farm develop a whole farm budget. Using funds from the Dairy Advancement Program (DAP) the farm family began working with a farm consultant in 2019 and continued into 2020. DAP provides assistance for business planning, business analysis and advisory teams. New initiatives of the program focus on improving record keeping for decision making and operational budgeting to improve annual operations.

Through the budgeting and planning process the Pooles found areas for improvement and began implementing recommended changes. This process came at a critical time, helping them to prioritize next steps to improve operations. The cows were housed in an older tie stall facility, with an older attached freestall. The barns were labor intensive and needed upgrading. The family determined, through the budgeting process, that a new barn and a robotic milker made more sense than trying to update and retrofit their older barns. Today they are milking in a beautiful new dairy barn which includes a robotic milking system. The family are great advocates for dairying, offering tours of their farm and engaging with the public through social media.

In the spring of 2020, a farm comprehensive nutrient management plan was completed with funding assistance from DAP. The farm is in the Chesapeake Bay Watershed and planning for proper application of nutrients to their land, forage needs for their cows, and crop rotation on a more formal basis, is valuable for their environmental stewardship objectives.

Strategic Farmstead Planning

PRO-DAIRY Specialist



Tim Terry works statewide with Cornell Cooperative Extension 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.

Strategic Farmstead Planning focuses on farmstead layout, facility design, and environmental planning to help farms maintain profitability and implement comprehensive nutrient management plans for environmental sustainability.

DIRECT OUTREACH

In 2020 Terry worked with 390 people and agribusiness providers on 56 farms on the topics of: robotic milking facilities, dairy and heifer housing, manure storages, bunker silos, ventilation, on-farm dairy processing, machine shops, long-term farmstead development planning, and environmental concerns.

FACILITY DESIGN

14 facility designs were drafted. When appropriate, these designs were shared with licensed professional engineers for final development, after which farmers were able to make the difficult decision of whether to proceed or to delay the project until a more fiscally suitable time.

COLLABORATION

The Farm Strategic Planning Specialist provided technical support to 26 CCE colleagues and other agribusiness personnel, serves on dairy profit farm advisory teams, and worked closely with the Wyoming County Soil and Water Conservation District on agriculture best management practices and farmstead development planning, including an experiential vegetative treatment area rehabilitation project.

EDUCATION

"Utility Scale Solar – What you need to know" has been reprinted and re-blogged by many agricultural partners. A "Watering Systems – Basics of Design" webinar was offered in a series on management of intensive grazing systems in partnership with the SWNY Dairy, Livestock, and Field Crops Team. A multi-part series of fact sheets was also developed and distributed about alternative manure treatments and nutrient recovery options. Terry also worked with the CNY and NNY regional ag teams to present four workshops on calf barn ventilation. The workshops were attended by 43 farm and agribusiness people.



Dairy Production Management

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.

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. Key programs include:

- Regional Shared Programs, including a two-day virtual Feeders School offered in English and Spanish and a six-part regional Modern On-Farm Preparedness training that was offered at three sites across the state in 2021.
- Dairy Management Webinars
- Spanish Wednesdays Webinars
- Dairy Production Online Courses
- Dairy Management Podcast Series
- Agriculture, Food & Environmental Systems In-Service

This program collectively reaches over 8,000 farmers each year.

ONLINE DAIRY MANAGEMENT COURSES AND PODCASTS

PRO-DAIRY in 2017 successfully launched a series of well-received online courses attended by students from across the country and the world. In the Real-Time experience students over seven weeks enhance their dairy management skills in a flexible learning environment on their own

time. Some dairy production management background is helpful, but the courses include basic to advanced content taught by leaders in the field. Students spend up to three hours per week on discussions, readings and assignments in a virtual classroom. Webinars provide an opportunity to meet weekly and ask questions in real-time. They are always recorded, so can be viewed after the live feed. Continuing education credits are offered along with a certificate of completion.

New this year, the **On-Demand** course includes recorded video lectures and weekly quizzes where students have six months to complete the course once enrolled.

On average, over 100 students take each course. In the evaluation of the courses, most participants indicated they would recommend the course to a colleague.

Course offerings in 2021 included:

- **Calf and Heifer Management** was offered a third time with 175 participants
- **Forage Management** was offered for the first time and had 118 participants
- **Dairy Cattle Reproductive Management** was offered in both English and Spanish
- **Transition Cow Management** had 92 participants
- **Milk Quality** was a joint project with Cornell University's Quality Milk Production Services with 55 participants

PRO-DAIRY also developed **new podcast series** that were well-received. **Dialing into Your Best Dairy** seven-part series on management factors that impact reaching the genetic potential of dairy cows and **Troubleshooting Herd Health Issues** 16-part series reached 11,609 people. An eight-part series **Dairy Responding to COVID-19** featured interviews during the early phase of the COVID-19 pandemic with many dairy industry representatives to discuss emerging issues and management strategies. Average number of listens was 556 per episode.

"Many seminars and conferences were cancelled because of COVID, and PRO-DAIRY filled the gap. The online course gave me access to reliable and applied field knowledge, and I was able to improve my practice's strategy for reproduction and calf management."

– Shinta Suwa
Yamamoto Herd Management Service Inc.

Dairy Herd Health & Management

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 at 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, developing trainings, integrating research results, identifying research needs, collaborating on-farm with advisors, and participating in industry-wide initiatives. Dairy farmers take their responsibility to provide good care for their cattle very seriously and are always looking for new ways to keep the herd healthy.

RESEARCH

Cornell University conducts a great deal of research focused on herd health and PRO-DAIRY's statewide outreach to share the results of this research is critical. PRO-DAIRY also supports applied research at the college and in partnership with CALS and the College of Veterinary Medicine. Current collaborative research articles include:

Partial budget analysis of culture- and algorithm-guided selective dry cow therapy. S.M. Rowe, D.V. Nydam, S.M. Godden, P.J. Gordon, A. Lago, A.K. Vasquez, E. Royster, J. Timmerman, M.J. Thomas, R.A. Lynch. *Journal of Dairy Science*, 2021.

The effect of 2 different premilking stimulation regimens, with and without manual forestripping, on teat tissue condition and milking performance in Holstein dairy cows milked 3 times daily. M. Wieland, P.D. Virkler, A. Weld, J.M. Melvin, M.R. Wettstein, M.F. Oswald, C.M. Geary, R.D. Watters, R. Lynch, D.V. Nydam. *Journal of Dairy Science*, Volume 103, Issue 10, 2020, Pages 9548–9560.

PROGRAMMING

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

In collaboration with Cornell Agricultural Workforce Development the COVID-19 and Your Dairy Farm Webinar about dairy management changes relative to the COVID-19 pandemic filled at 300 and the recorded presentation has had 550 views.

The 2021 Northeast Dairy Production Medicine Symposium was held virtually due to COVID-19 with about 150 attendees. Attendees received 9.75 hours of veterinary continuing education credits and 97 percent of those who completed the evaluation indicated the event was good/outstanding.

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, and the Northeast Dairy Producers Association (NEDPA) Animal Well Being Work Group, the NEAFA Planning Committee, 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 NWNYS Dairy, Livestock and Field Crops Team. Lynch also serves on the Summer Dairy Institute Board of Directors and is an Instructor, and is a Co-Chair of the Northeast Dairy Production Medicine Symposium.



Robert Lynch, PRO-DAIRY Dairy Herd Health & Management, served as a volunteer veterinarian for the Dairy Birthing Center at the Great New York State Fair. Photo credit to the New York Animal Agriculture Coalition, which coordinates the Birthing Center.

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.

Current articles include:

- Dairy Herd Reproductive Records Analysis. Veterinary Reproduction 2nd Edition
- Health Considerations Related to Antibiotic Use on Dairy Farms
- COVID-related Farm Business Safety Plans in New York. This was a group project including multiple CCE specialists to develop help guides for all essential and nonessential NYS agricultural businesses. A resource document was created for each business category to facilitate the writing of safety plans required by NYS. Lynch customized a guide specific to large animal veterinary practices since these businesses often contain elements of both office and retail.



Dairy Youth Programs

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 20 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, where personal and professional leadership is developed in a networking environment where the diversity of career options in agriculture are discovered.

Over the past 20 years, 98 percent of the over 450 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.



“Junior Dairy Leader is a huge exposure tool,” said John Mueller, Willow Bend Farm, whose son Thomas, and farm employees, have graduated from the program. “It’s a hook to get youth excited about the industry and opens their eyes to the possibilities, so you’re getting the best and brightest staying in the industry. Labor is desperately short. JDL recruits and retains young kids in agriculture. We need them, to hire them, and for them to become the next generation of leaders in the industry.”

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 100 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.

Dairy Industry Communications

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 8,654 farms in the East.

Timely news is delivered via e-Alerts and a monthly e-Leader newsletter to an email list of nearly 7,000 producers, agriservice and legislators.

This list is also used for event, program, 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 newly 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

Nearly 22,000 people have visited PRO-DAIRY's website since this year's redesign.





“PRO-DAIRY continues to be a critical force for New York’s dairy industry. For over thirty years, PRO-DAIRY has developed and delivered programs and services to address critical management elements of a successful dairy farm business. Whether it’s managing nutrients, maximizing forage quality, addressing herd health issues, or achieving sustainable profitability, PRO-DAIRY is there for New York dairy farms. The Northeast Agribusiness and Feed Alliance proudly supports this essential program.”

– Danielle Penney Stroop
President, Northeast Agribusiness and Feed Alliance



For more information:

PRO-DAIRY, 272 Morrison Hall
Cornell University, Ithaca, NY 14853

Dr. Thomas Overton, Director

Email: tro2@cornell.edu

Phone: 607.255.4478

Fax: 607.255.1335

prodairy.cals.cornell.edu