



2020 Annual Report

Reflecting activities from October 2019 - June 30, 2020

WISCONSIN DAIRY STATS

7,026

DAIRY FARMS

(as of Sept. 1, 2020)



more farms than
any other state



30.6

BILLION

pounds of milk
produced
annually

1,257,000

COWS

(That's almost half as
many cows as 1950!)



2ND NATIONALLY
in milk production

1ST NATIONALLY

in cheese
production



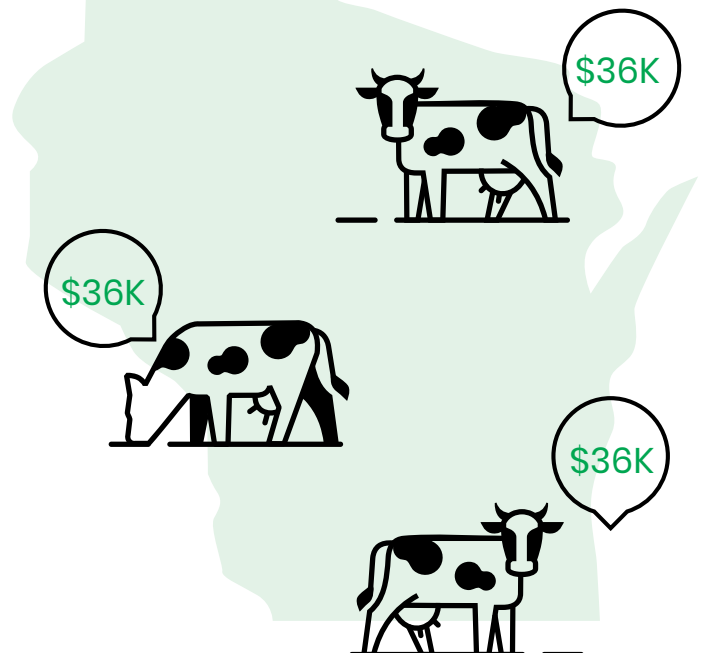
\$45.6 BILLION

in economic activity to the
state of Wisconsin

**EVERY COW IN WISCONSIN
GENERATES**

\$36,000

IN ECONOMIC ACTIVITY PER YEAR.



Sources: USDA NASS and Contribution of Agriculture to the Wisconsin Economy: An update for 2017 by Steven Deller, UW-Madison.

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On the cover: Assistant professor of dairy science at UW-Madison Jennifer Van Os takes notes while conducting an airflow study in a cross-ventilated barn at Rosy-Lane Holsteins in Watertown, Wis. Van Os received a grant from the Hub for specialized camera equipment to better observe animal behavior. *Photo by Michael King/UW-Madison CALS.* Left: Dairy professionals, legislators and legislative staff tour UW-Platteville's Pioneer Farm during an early Dairy Innovation Hub planning session. *Photo by Andy McNeill/UW-Platteville.*



“

As we reflect on our first year, it is encouraging to see the progress that can be achieved when enthusiastic participants come together.

”

Dr. Heather White

faculty director | Dairy Innovation Hub

We have wrapped up the first fiscal year, which was a partial year, with substantial progress and have laid a foundation for productivity. This initiative encompasses all aspects that influence the dairy community and allows us to pursue innovation and solutions that will **ensure Wisconsin farms, cheese makers, professionals and communities continue to lead in the national and international dairy spaces.**

Building research capacity, recruiting top talent, supporting innovative research, and engaging in outreach and instruction are the fabric of the Hub. Through the process, we have engaged faculty who are new to dairy research, bringing new skills and innovative approaches. Identifying new faculty positions is also underway across all three campuses. The investment in new faculty represents the long-term vision of the Hub which complements the short-term victories gained by our research efforts in the first year.

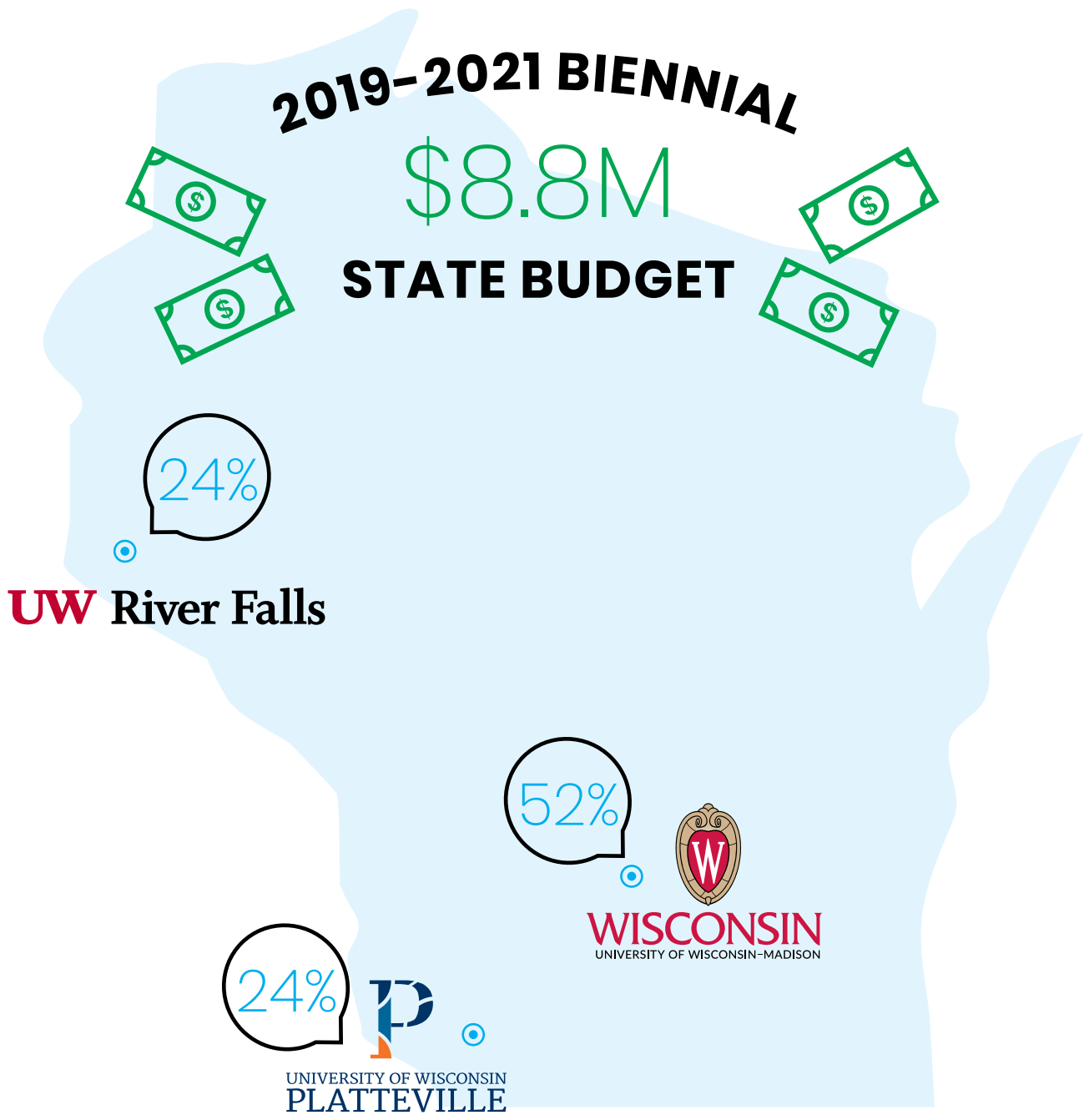
The Hub was envisioned to stimulate collaboration across the three campuses involved. Linked by a common mission to educate students in dairy science, the three campuses each have unique strengths. UW-River Falls and UW-Platteville are comprehensive campuses, primarily focusing on undergraduate education; however, there lies a wealth of faculty who would engage in research if given the resources. With research and instruction as key missions at UW-Madison, faculty are dedicated to research, but the Hub has added capacity. Collaboration of faculty across departments, colleges and campuses brings richness to our research and improves the student experience.

As we reflect on our first year, it is encouraging to see the progress that can be achieved when enthusiastic participants come together. Our advisory council and local steering committees have been essential in making the vision for the Hub a reality. These groups ensure that we are staying true to the mission and remain focused on the innovative solutions that our dairy community needs.

A handwritten signature in cursive script that reads "Heather White".

Who we are

The Dairy Innovation Hub, which the state of Wisconsin supported to the tune of \$1 million in FY20 and \$7.8 million per year in subsequent years, harnesses research and development at UW–Madison, UW–Platteville and UW–River Falls campuses to keep Wisconsin’s \$45.6 billion dairy community at the global forefront in producing nutritious dairy foods in an economically, environmentally and socially sustainable manner.



The Hub has four key priority areas:

Stewarding land and water resources

Reduce water use; improve soil health; improve air quality & limit use of land resources; develop alternative uses and markets for manure; and minimize nutrient losses to lakes and rivers.

Enriching human health and nutrition

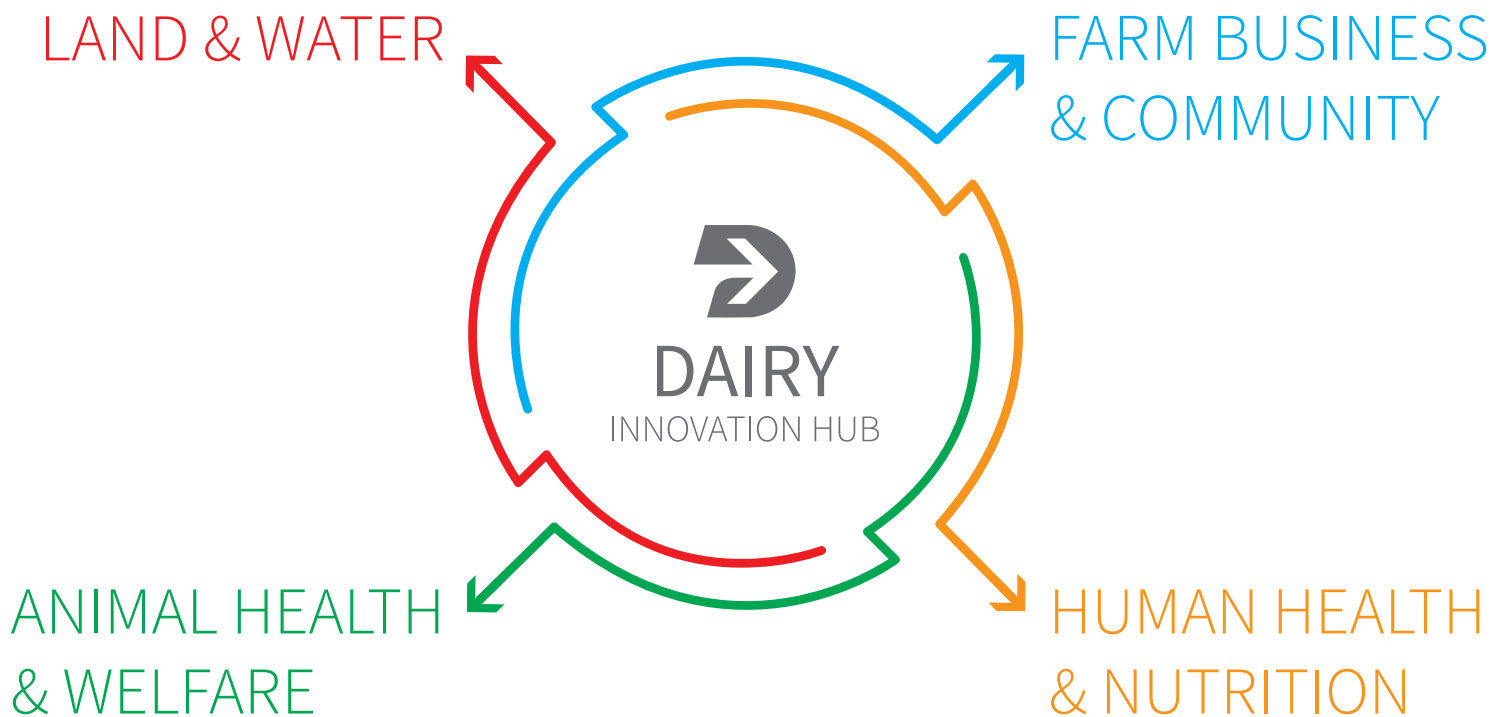
Limit risk of food-borne illnesses; reduce obesity & preventable health problems; create lactose-intolerant & allergy-free alternatives; improve the nutritional value of milk & meat; minimize pathogen risks in soil & water; and design packaging for convenience & shelf life

Ensuring animal health and welfare

Find effective alternatives to antibiotics; monitor animal health with sensor technologies; improve reproductive rates & replacement policies; reduce animal stress & enhance consumer trust; minimize risk of disease from animal contact; and deploy genomic selection for healthy animals.

Growing farm businesses and communities

Establish agricultural technology start-ups; use big data to optimize dairy farms; market specialty milk & meat products; develop skilled & tech-savvy rural workforce; improve financial literacy & return on assets; and understand supply chains, global markets and areas of opportunity.



Thinking globally, acting locally

MISSION: Position Wisconsin's dairy community for economic, environmental and social success by advancing science, developing talent and leveraging collaboration.

VISION: To be the world's preeminent source of bold new discoveries and talent development in dairy.

CORE VALUES:

- » **Awareness**
 - We are grounded by the realities of the dairy community. We seek to be dialed-in to the needs and conditions of our stakeholders.
- » **Learning and Discovery**
 - We support scientific advancement and evidence-based decision-making. We want to be a platform for lifelong learning and action.
- » **Collaboration**
 - We actively contribute to university partners and stakeholders working together as a team. We acknowledge the power of relationships.
- » **Respect**
 - We embrace diverse perspectives, cultures, audiences and business philosophies. We treat everyone with dignity and respect.
- » **Accountability**
 - We take the stewardship of resources seriously. We will take responsibility for the success or failures of our efforts.
- » **Creativity**
 - We encourage looking at common problems through a different lens. We will foster the spark of innovation and find answers to tomorrow's challenges.

Dairy Task Force 2.0

In June of 2018, the Wisconsin Dairy Task Force 2.0 was created as a joint effort between DATCP and the University of Wisconsin System with the goal of recommending actions to maintain a viable and profitable dairy community in Wisconsin.

The task force made 51 recommendations to achieve the initial charge. The creation of a "Dairy innovation Hub" was one of the top-rated recommendations. University partners, agencies and related associations immediately started working on a funding plan for the state budget. Today, the task force's initial recommendations help steering committees prioritize projects funded by the Hub.



Photo by Michael King/UW-Madison CALS.

Our leadership

Pioneer Farm is UW-Platteville's 430-acre, 180-cow teaching, research and outreach facility that hosts several Hub-funded projects for 2020-2021. Photo by Andy McNeill/UW-Platteville.



Wayne Weber

Dean, College of Business, Industry, Life Science & Agriculture, UW-Platteville

UW-Platteville has made incredible strides since the initial Hub funding allocations. A hallmark of the Hub is collaboration, and this has been implemented from the start through the advisory council, that includes university and stakeholders, to a regional faculty steering committee and local advisory council made up of dairy community partners.

A primary focal point of the Hub is to bring in top talent to stimulate innovation through active and relevant research. UW-Platteville has also made significant progress here recruiting two top quality research faculty: one with expertise in ruminant nutrition and the other in agricultural and biosystems engineering. We are also working to support current research in

agroecosystems and building a foundational research infrastructure through research support staff, equipment and facilities.

To facilitate an immediate impact on the dairy community, we have implemented a framework for short-term high impact research projects through the development of Dairy-Industry, Impact and Innovation (DI3) faculty fellowships. All the projects are innovative and directly relevant to the dairy community. These, and future accomplishments, depend on a local champion and strong leadership which Dr. Tera Montgomery has provided at UW-Platteville. In short, in the approximate nine months since the beginning of Hub funding, UW-Platteville has made significant strides building a foundation for powerful innovative impact on the dairy community.



Kathryn VandenBosch

Dean, College of Agricultural and Life Sciences, UW-Madison

No doubt we will always remember 2020 as an unusual year. Despite the challenges and unexpected events it has delivered, the Dairy Innovation Hub remains a bright spot. Through this partnership, we are building stronger collaborations among UW campuses, farmers and dairy food partners. We are seizing opportunities to keep dairy on the forefront through advancing the ways we steward natural resources, improve human health, promote animal welfare and grow Wisconsin businesses.

At UW-Madison, the Hub's opportunities have created a talent magnet - for Ph.D. grads, who are joining innovative research teams, and for faculty from diverse disciplines to tackle dairy projects, some for the first time.

Researchers have also undertaken 'short-term, high-impact projects' to quickly develop solutions to address immediate needs, including those defined by the Dairy Task Force 2.0. We are excited to commence hiring new faculty, which will have a long-term impact on our capacity to generate solutions for the dairy community.

The current global health pandemic underscores how connected all living things are across the planet. Connections can lead us to more rapid innovations. This year, we launch the Dairy Innovation Hub to great expectations, which I know we will be able to meet because of the partnerships and shared commitment to building the best dairy industry for the people of Wisconsin and the world. I know I am going to remember 2020 for the launch of the Dairy Innovation Hub and the ground-breaking discoveries that will result.



Dale Gallenberg

Dean, College of Agriculture, Food and Environmental Sciences, UW-River Falls

Our primary focus in the first year was to establish a framework for efficient and effective use of base funding. This will help ensure the additional capacity created in research, teaching and outreach is properly focused and sustainable. We formed a campus steering committee comprised of department chairs, faculty and staff from across CAFES to help provide oversight of activities. The committee is charged with making funding decisions on proposals submitted for the various Hub priority areas.

Year 1 funding was spent on equipment, supplies and facilities renovations. Laboratories on the main campus as well as our dairy facility at the Mann Valley Farm benefitted from these funds. Analytical equipment, basic laboratory renovations, hutches for young cattle, and installation of gates and panels for dairy herd separation are examples.

We also awarded several faculty research fellowships which are in progress with Year 2 funding. These fellowships provide the capacity for current faculty, most of which have 100 percent teaching appointments, to further engage in research important to the Hub's overall goals. The initial awards cover multiple research projects across several departments, and nearly all involve multiple faculty in a collaborative approach.

Advisory council

The advisory council fosters two-way communication and idea generation between Wisconsin's dairy community and university partners.



Above right: Joao Dorea, assistant professor of dairy science at UW-Madison, received Hub funding for a postdoctoral researcher and equipment to develop computer vision systems to monitor cow health. Photo by Michael King/UW-Madison CALS.

OPERATING PRINCIPLES:

- » Collaboration between three campuses
- » Brings ideas to the leadership committee
- » Advises funding priority areas
- » Shares outcomes with broader community
- » Maintains transparency and accountability
- » Curates a culture of mutual trust and honesty
- » Creates focus and balance; prevents mission creep
- » Honors talents; supports leadership and program structure

COUNCIL MEMBERS:



Aric Dieter
Landmark Services
Cooperative,
Dairy Business Association



Angela James
Department of Agriculture,
Trade & Consumer Protection



Steve Kelm
UW-River Falls



Shelly Mayer
Professional Dairy Producers
of Wisconsin



Mitch Breunig
Mystic Valley Dairy,
Dairy Business Association



Dave Daniels
Mighty Grand Dairy,
Wisconsin Farm
Bureau Federation



Tera Montgomery
UW-Platteville



Scott Rankin
UW-Madison



Rami Reddy
UW-Platteville



John Umhoefer
Wisconsin Cheese
Makers Association



Kent Weigel
UW-Madison



Heather White
faculty director (ex officio)

Campus updates

UW-Madison

FY 20 accomplishments:

- » Six postdoctoral fellowships awarded
- » Seven awards for capacity building equipment
- » Seven awards for short-term, high-impact research projects
- » Developed four faculty positions and hiring procedures
- » Accepted proposals for graduate student assistantships, including proposals for collaboratively mentored students from UW-Platteville and UW-River Falls.

Steering committee:



Victor Cabrera
Animal and Dairy Sciences



Paul Mitchell
Agricultural and
Applied Economics



Denise Ney
Nutritional Sciences



Scott Rankin
Food Science



Matt Ruark
Soil Science



Troy Runge
Biological Systems
Engineering



Kent Weigel
Animal and Dairy Sciences



Heather White
Animal and Dairy Sciences



Heidi Zoerb
CALS External Relations

UW-Platteville

FY 20 accomplishments:

- » Budget planning, steering committee and external stakeholder committee selection, regular meetings
- » Facility and infrastructure upgrades at Pioneer Farm for research and Hub collaborations
- » Recruited and hired two faculty scientists: ruminant nutrition and biosystems engineering
- » Seven faculty research fellowships awarded
- » Five awards for supplies and equipment
- » Submitted proposal for collaborative graduate student assistantship co-mentored with UW-Madison

Steering committee:



Tera Montgomery
Animal Science



Rami Reddy
director, School of Agriculture



Chuck Steiner
director, Pioneer Farm



Krista Hardyman
Animal Science



Kevin Bernhardt
Agribusiness; Center For Dairy Profitability



Austin Polebitski
Civil and Environmental Engineering

UW-River Falls

FY 20 accomplishments:

- » Budget planning, steering committee selection and management, regular meetings
- » Consultations with CAFES department chairs and UW-River Falls administration
- » Six faculty research fellowships awarded
- » Supplies and equipment grants awarded: Eight in FY 20, five in FY 21
- » Staff search for dairy herd research manager
- » Developing four faculty positions: Animal welfare and food technology searches will convene in FY 21
- » Submitted proposals for collaborative graduate student assistantships co-mentored with UW-Madison

Steering committee



Steve Kelm
Animal and Food Science



Peter Rayne
Animal and Food Science



Holly Dolliver
Plant and Earth Science



Brenda Boetel
Agricultural Economics



Joel Peterson
Agricultural Engineering
Technology



The Mann Valley Farm sits on 475 acres just north of River Falls. Among other enterprises, the farm is home to a working dairy herd and the Dairy Learning Center which includes indoor classrooms, a milking center and a pavilion for livestock sales and shows. Numerous groups and tours visit the Mann Valley Farm during the year including Camp Badger Exploring Engineering Camp (left). This camp is geared toward middle school students who are interested in science and math careers. *Photos by Kathy Helgeson/UW-River Falls.*



Our partners



Tom Crave

president | Dairy Business Association

“Through next-generation research in areas such as land and water use, health and nutrition and integrating farm businesses, the dairy hub will keep us on a track toward long-term success. There are a lot of great things to come for our dairy community.”



Shelly Mayer

executive director | Professional Dairy Producers of Wisconsin

“PDPW’s board of directors is thrilled to see the Dairy Innovation Hub funded and immediately taking action to begin researching important areas in dairy that will lead to bold new discoveries to solve tomorrow’s problems. Having worked behind the scenes with the UW System, CALS and the Dairy Science department, the board’s number-one priority has been to bring to life this essential initiative. Birthed by an unparalleled level of collaboration and communication on behalf of all sectors in the dairy community, the Dairy Innovation Hub is a landmark resource – we’re proud to have been involved in the process.”



Randy Romanski

secretary-designee | Wisconsin Department of Agriculture, Trade and Consumer Protection

“The Dairy Innovation Hub was highly recommended by the members of the Dairy Task Force 2.0 and is a commitment and an investment in the long-term prosperity of Wisconsin’s dairy community. Wisconsin is recognized worldwide as a dairy leader. Key discoveries in critical areas including our land and water resources, human and animal health and farm businesses will benefit our entire state and the dairy community for years to come.”



Joe Bragger

president | Wisconsin Farm Bureau Federation

“The Dairy Innovation Hub is well positioned to further promote our state’s \$45.6 billion dairy community. The four key focus areas: enriching human health and nutrition, ensuring animal health and welfare, growing farm businesses and communities and stewarding land and water resources, will serve and benefit all Wisconsinites. As a dairy farmer myself I know the importance of using sound science to care for our land and livestock while producing a healthy and sustainable product. The Dairy Innovation Hub will help deliver more options in all areas of production and distribution.”



John Umhoefer

executive director | Wisconsin Cheese Makers Association

“Innovation – new products and new solutions that bind the dairy community to the aspirations of a new generation of global consumers – must be the driving force in U.S. dairy. The Dairy Innovation Hub directly addresses innovation by empowering our greatest asset: talented individuals with fresh ideas. The future of the dairy community and the future of innovation in dairy are one and the same, strengthened by the organization and continued backing of the Hub.”

Research profiles



Stewarding land and water resources

Susi Wiesner

postdoctoral fellow | Department of Biological Systems Engineering
UW-Madison

Project title: Reducing life cycle environmental impacts & improving profitability of Wisconsin dairy systems through improved cropping management

Summary: Our project assesses innovation opportunities that increase profits and enhance environmental stewardship on Wisconsin's dairy farms

by altering cropping sequences and nutrient management, while lowering external inputs and improving profits through credits for ecosystem services. We will assess environmental and economic outcomes associated with transitions of traditional dairy systems to greater cropping diversities using cover crops, intercropping and perennials. In the light of climate change, agroecosystems need to be managed differently to withstand more frequent changes in weather. Weather extremes in Wisconsin can be particularly complicated, because they exist at both ends of hydrological extremes, from extreme rain events and flooding to extreme droughts.

Suitable agricultural management can help prevent crop losses during those disturbances. Perennial crops have longer, and more dense root systems compared to annual plants like corn, that penetrate the soil deeper. This can open up pore space, which helps to increase water infiltration; and reduce nutrient runoff. Building organic soil layers can also help retain moisture, which is important during drought periods. Additionally, farmers could increase their profits through credits for the mitigation of greenhouse gases from perennial plant cover and better nutrient management.

Credits like these already exist in the US. We will establish an optimization function to help dairy farmers assess to what degree they could increase their environmental sustainability through the implementation of perennials, and how that would impact milk production and credits for ecosystem services. *This research is being conducted with guidance from Paul Stoy, associate professor of biological systems engineering.*

An audience of heifers supervise while researchers measure soil respiration on grazed pastures.





Stewarding land and water resources

Patrick Woolcock

assistant professor | Department of Agricultural Engineering Technology
UW-River Falls

Project title: UWRF Mann Valley Farm bovine biochar compost research expansion

Summary: This project focuses on the practical implementation of compost and biochar to develop a system that is more environmentally robust while adding potential sources of revenue and cost savings.

In conventional agriculture, use of tillage, artificial fertilizers, pesticides, and other chemicals are the norm for many farmers. However, not only are these processes expensive, but the reserve of productivity that is contained within the soil is also constantly diminished, ultimately resulting in less healthy soil and plants more susceptible to stresses. While direct application of manure can mitigate some nutrient needs, it has its own societal and environmental challenges. Research on composting and biochar applications have shown significant potential to mitigate many of these challenges but require extra effort to incorporate into a farming system. The purpose of this work is to determine the feasibility and benefits of optimizing a biochar compost product from bovine manure, and then ultimately selling a portion and field applying a portion for the environmental and financial benefits.

This study involves initial laboratory testing which is then applied to field-based trials followed by economic assessment of the results. Manure will be composted both with and without biochar and then applied to field plots in order to assess the potential for environmental improvement as a slow release fertilizer. In addition to the field trials, a portion of the compost will be sold. Finally, the data will be used to provide an assessment on the overall economics and feasibility of the process. *This research is being conducted with collaboration from Natasha Rayne, Youngmi Kim, Kelly Wilhelm and Simon Jette Nantel.*



From left: Mark Watrud, laboratory farms staff, Patrick Woolcock and Gregory Zwald, farm director.



Enriching human health and nutrition

Denise Ney

professor | Department of Nutritional Sciences
UW-Madison

Project title: Glycomacropeptide (GMP) derived from cheese whey: treating obesity by manipulating satiety hormones and the gut microbiota.

Summary: In this project, we will create a value-added product from cheese whey, a GMP protein supplement to treat obesity and prevent related health problems in humans. Obesity affects one in three adults and contributes to inflammation, diabetes, cardiovascular disease and

premature death. GMP is a 64 amino acid glycoposphopeptide isolated from cheese whey. Our pilot studies in humans and mice indicate that GMP has anti-obesity properties, especially in females. GMP reduces hunger hormones and inflammatory cytokines, increases fat oxidation and functions as a prebiotic to alter the gut microbiota.

Our objective is to evaluate the effect of GMP on satiety hormones, glucose homeostasis and the gut microbiota in 10 obese, postmenopausal women in a crossover study. Our goals are to obtain additional data supporting GMP as a weight loss supplement, thus supporting revision of a National Institute of Health (NIH) grant to evaluate the anti-obesity effects of GMP. The tangible outcome is the creation of a novel GMP protein supplement from sweet cheese whey that treats obesity. We project a GMP supplement will be available for sale by 2021-2022 via an issued WARF patent.

“I hope our research furthers understanding of the unique health benefits of specific dairy components and results in a dietary supplement that will allow women to lose weight and maintain their bone health.”

Right: GMP is found in milk within the k-casein micelle and isolated from sweet cheese whey. GMP is the only known dietary protein that does not contain the amino acid Phe. New evidence suggests that a GMP dietary supplement may help women lose weight and reduce inflammation by altering hormones and the gut microbiota.





Ensuring animal health and welfare

Sylvia Kehoe

professor | Department of Animal and Food Science
UW-River Falls

Project title: Developing a novel method of applying disbudding paste safely and effectively on newborn dairy calves.

Summary: The prevention of horn growth is a necessity on dairy farms to keep both animals and humans safe. Around 16% of dairy farmers use disbudding paste to do this but the method is not always consistent and safe for the animal or employee. Having an applicator that is reusable or

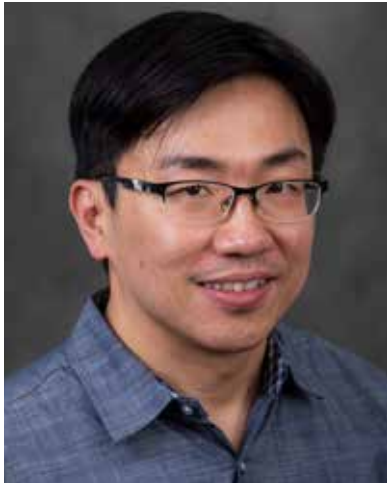
disposable can make this process much more consistent, however there is nothing currently on the market. My work has focused on a number of prototypes that have been altered over the last few months. The applicator is still in development but once it is finalized, I will conduct a larger study on a commercial dairy farm that will ensure its effectiveness, safety and consistency.

The Dairy Innovation Hub has provided me with the resources I need to help our dairy farmers raise healthy and productive dairy calves. It's also exciting to provide research opportunities for our undergraduates who are going to enter the dairy community as farmers, professionals, veterinarians or attend graduate school. The ability to help farmers by making the process of raising dairy calves a little easier is a wonderful feeling. If I can make a protocol safer and more effective for even a few dairy farmers, it's worth it! *In addition to this project, Dr. Kehoe is working to survey mineral and vitamin concentrations in calves who are fed pasteurized waste milk.*



Clockwise: The applicator affixes to the calf's head. Calves move freely with the applicator. Applicators would come pre-loaded with disbudding paste for safety and ease.

Growing farm businesses and communities



Joseph Wu

associate professor
Chemistry
UW-Platteville

Project title: Development of milk-protein-based 3D printing biocomposites using spoiled milk and whey from dairy processing waste

Summary: Casein and whey have been shown to have unique polymer properties for commercial applications. This project will explore the idea of converting casein in waste milk and whey from cheese byproduct to make filaments for the ever-growing 3D printing sector. Casein holds great promise as a major component in 3D printing filament material. Also, water soluble whey can be modified to be compatible with the filament making process.

Applying existing experience and knowledge in biocomposite development will help us realize the hidden potential of sustainable casein and whey in material development for 3D printing. Expected deliverables are milk protein-based filaments, 3D printed specimens and property data based on characterizations. Achieving the projected milestones in this work will create a new channel of demand for milk and milk protein products and new ways to utilize spoiled/bacteria-contaminated wastes from processing facilities. This could potentially help farmers and communities avoid financial losses.

This Dairy Innovation Hub enabled collaborative research involving faculty members in chemistry and mechanical engineering provides opportunities to mentor our students on interdisciplinary work that will be impactful on their careers. Also, providing an alternative use for dairy products that would otherwise be considered waste through 3D printing could potentially provide new revenue streams for dairy processors, which would in turn help farmers and communities in Wisconsin.



John Obielodan

associate professor
Mechanical and Industrial
Engineering
UW-Platteville



Casein, the protein in milk is chemically similar to nylon and has potential to be used in 3D printing. Pictured here is a 3D printer at UW-Platteville's mechanical and industrial engineering program.

Growing farm businesses and communities



Claudine Pied

associate professor
Social Sciences
UW-Platteville



Shan Sappleton

associate professor Social
Sciences
UW-Platteville

Project title: Understanding impacts of changing agricultural land on southern Wisconsin's dairy farms and rural communities

Summary: Changes in agricultural land underlie many of the transitions facing the dairy community, farm families and their local communities. In some regions of the state, economic pressure for residential and commercial development has led to a decline in agricultural land, while in other areas, land is more likely to be consolidated into larger farms or purchased by investors. This research asks how these land changes are affecting southern Wisconsin dairy farms and rural communities.

More specifically, we ask how dairy farmers' and community members' connections to the land affect their decisions; how landowners and farmers make decisions about what to do with their land; and which land-based agricultural, conservation and recreation policies would most effectively support the interests and needs of small and mid-sized dairy farms and their communities.

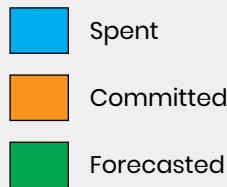
We will use a mixed-method approach to study the effects of land changes and potential solutions. In the first phase of the project, researchers will analyze existing data on the economies, populations and land sales of Grant and Dane counties. In the second phase, student and faculty researchers will interview farmers and community members to learn about their relationship to the land, how their land use has changed and the benefits and barriers of various agricultural land-use programs. In phase three, a survey will focus on differences in the towns and regions of southern Wisconsin. Study results will ultimately help dairy leaders, government agencies and nonprofit organizations make decisions about land use policy.

“we hope that the research process itself will build stronger connections between social science and agriculture”

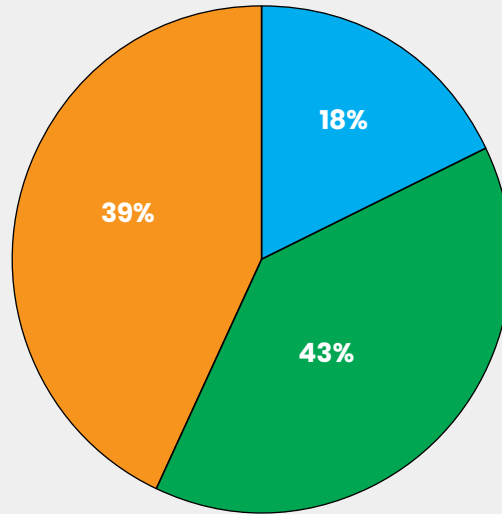
The dairy community is inextricably tied to Wisconsin's rural landscapes. We hope this data will draw attention to how changes in agricultural land ownership and use are affecting this landscape and local communities. This research will also bring the ideas and experiences of dairy farmers and community members to the regions' policy makers. Finally, we hope that the research process itself will build stronger connections between social science and agriculture and increase student awareness of land stewardship, strong farms and healthy communities.

Financial overview

2019–2021 Wisconsin biennial budget



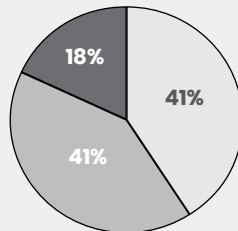
» **\$1M for FY 20**
 » **\$7.8M for FY 21**
 Total: \$8.8M



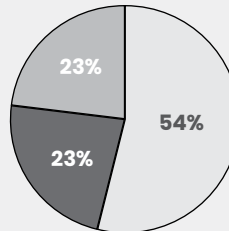
With funding approved in October 2019, the \$1M FY 20 and \$7.8M FY 21 biennium investment has already seeded recruitment of new talent, equipment investments and research projects. Early funding commitments and those forecasted for FY 21 closely follow the approved spending plan.



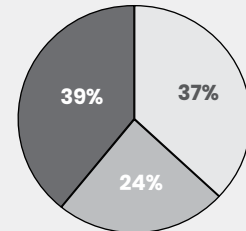
Spent YR 1



Committed YR 1-2



Forecasted YR 1-2



FINANCIAL HIGHLIGHTS:

Total
\$485K
MONEY AWARDED
 in first six months

Total
\$5.1M
FUNDS ALLOCATED
 for new dairy talent

Communications and outreach efforts

SOCIAL MEDIA



From May 1 (when the Hub created socials) – June 30, 2020:

- » 525 followers on Facebook, Twitter and YouTube.
- » Top Facebook post: “Invisible fence for cows”, UW-Platteville, 5,900 reach.

- » 23,700 impressions on Twitter from June 1– June 30.
- » 1,044 views on YouTube.
- » All organic reach, no sponsored posts.

MEDIA MENTIONS

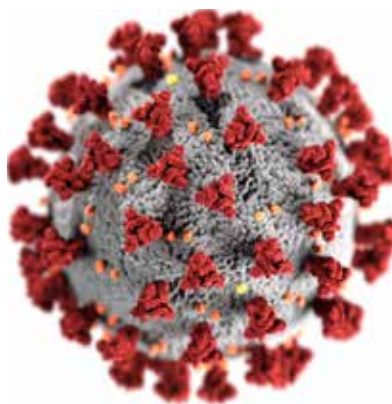
- » 124 popular press mentions.
- » Eight press releases sent to promote funding decisions at UW-Madison, UW-Platteville and UW-River Falls.

OUTREACH IMPACT

- » 18 public and stakeholder presentations given. Including campus brainstorming sessions, conferences, information sessions for citizens, trade groups, agencies and legislators.

COVID-19 WEB PAGE

In addition to planned research efforts, the Hub coordinated several COVID-19 resources, including an online form for questions related to dairy and coronavirus. The page includes resources from UW Extension, stakeholder groups, the CDC, DATCP and more. The Hub also supported the database of experts from all three campuses who were called on to speak to media, on webinars and gave input into resource creation for farmers.



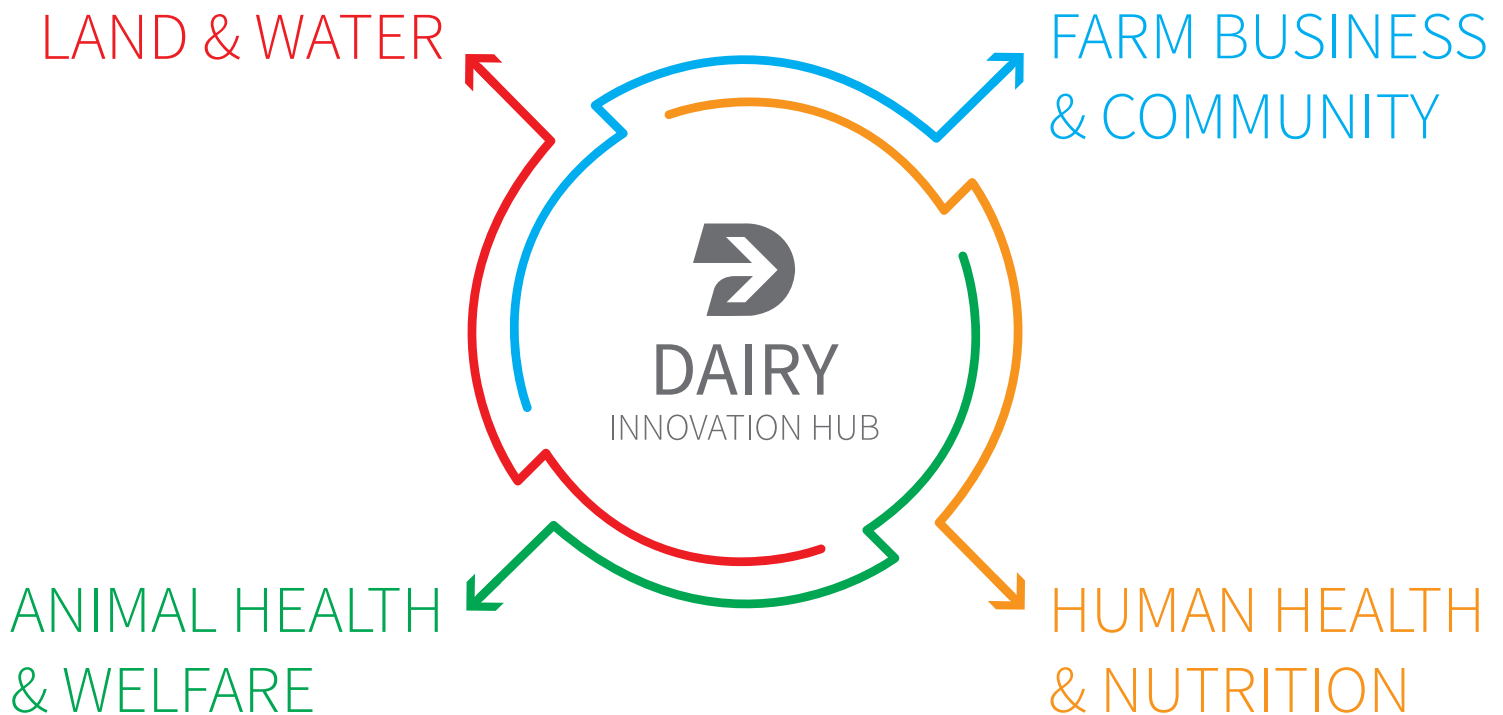
VIRTUAL DAIRY SUMMIT



Hosting a public symposium-style event featuring research and outreach funded by the Dairy Innovation Hub was a core deliverable envisioned when funding was approved by the legislature. Like many events in 2020, the inaugural Dairy Summit will be held virtually. Despite this pivot in format, the event will be free, open to the public and recorded. Please save the date of November 18!

Award listing

FY 2020 funding decisions by priority area



Stewarding land and water resources

UW-Madison

Postdoctoral fellowships

- Efficacy of manure nutrient prediction and variable rate technology to improve nutrient use efficiency on Wisconsin dairy farms – Postdoc: Xiaoyu Feng, Department of Biological Systems Engineering, PI: Matt Digman, Department of Biological Systems Engineering
- Reducing lifecycle environmental impacts and improving profitability of Wisconsin dairy systems through improved cropping management – Postdoc: Susanne Wiesner, Department of Biological Systems Engineering, PI: Paul Stoy, Department of Biological Systems Engineering *See profile on p. 16*

Equipment

- Low-field nuclear magnetic resonance – Matt Digman, Department of Biological Systems Engineering
- C-Lock GreenFeed unit – Michel Wattiaux, Department of Animal and Dairy Sciences

Short term, high impact grants

- Mobile maps for better manure management – John Panuska, Department of Biological Systems Engineering
- Water quality, nitrogen use efficiency, and soil health: the shovel-ready projects of the UW-Discovery Farms – Matt Ruark, Department of Soil Science

Graduate student assistantships

- Increasing environmental stewardship of dairy forage production systems with cover crops – Francisco Arriaga, Department of Soil Science
- Pyrolyzing dairy manure solids to recover manure nutrients – Rebecca Larson, Department of Biological Systems Engineering; Joseph Sanford, School of Agriculture, UW-Platteville (collaborative)

UW-Platteville

Faculty research fellowships

- Local virtual enclosures to enforce managed grazing – Harold T. (Hal) Evensen, Engineering Physics; Cyrus Habibi, Electrical Engineering; Andrew Cartmill, Soil & Crop Science; Chris Wilson, farmer and community partner

Equipment

- EZweights 365 touch monitor package scale house for digital commodity, feed, manure and compost records and data collection – Chuck Steiner and Justin Daugherty, Pioneer Farm
- Advanced manure separation technology, nutrient management and composting at Pioneer Farm – Chuck Steiner and Brian Ostby, Pioneer Farm

UW-River Falls

Faculty research fellowships

- Strategic study of factors influencing contaminant transport from the land surface into aquifers – Jill Coleman Wasik, Department of Plant and Earth Science
- Novel dairy cropping systems to enhance economic and environmental resilience of Wisconsin dairy farms – Veronica Justen, Department of Plant and Earth Science
- UWRF Mann Valley Farm bovine compost research expansion – Patrick Woolcock, Department of Agricultural Engineering Technology *See profile on p. 17*

Equipment

- Environmental test chamber – control growing conditions for plants and seedlings – Veronica Justen, Department of Plant and Earth Science
- PCR equipment – Sonja Maki, Olutoyosi Ajayi-Oyetunde, David Zlesak, Department of Plant and Earth Science
- Analytical balance for in-house production of standards for equipment calibration – Jill Coleman Wasik, Holly Dolliver, Natasha Rayne, Kelly Wilhelm, Department of Plant and Earth Science
- Large capacity muffle furnace and related equipment – Jill Coleman Wasik, Holly Dolliver, Natasha Rayne, Kelly Wilhelm, Department of Plant and Earth Science and Patrick Woolcock, Department of Agricultural Engineering Technology

Growing farm business and community

UW–Madison

Short term, high impact grants

- Analyzing the costs and benefits of manure management regulations for dairy farm economic viability and soil and water sustainability – Jeremy Foltz, Department of Agricultural and Applied Economics
- Dairy Innovation Hub student challenge – Heidi Zoerb, External Relations, College of Agricultural and Life Sciences
- Network analysis of dairy supply chains – Steven Deller, Department of Agricultural and Applied Economics

Graduate student assistantships

- Dairy residue bioconversion into designer (D)–Lactic acid – Timothy Donohue, Department of Bacteriology
- Assessing maize silage yield and quality using UAV-based hyperspectral imagery and machine learning – Zhou Zhang, Department of Biological Systems Engineering

UW–Platteville

Faculty research fellowships

- Changing agricultural land: Understanding impacts on southern Wisconsin's dairy farms and rural communities – Claudine Pied and Shan Sappleton, Social Sciences [See profile on p. 21](#)
- Development of milk-protein-based 3D printing bio composites using spoiled milk and whey from dairy processing waste – Joseph Wu, Chemistry; John Obielodan, Mechanical and Industrial Engineering [See profile on p. 20](#)

UW–River Falls

Faculty research fellowships

- Calf management practices, animal welfare and the social sustainability of the dairy industry – Albert Boaitay, Department of Agricultural Economics

Ensuring animal health and welfare

UW–Madison

Postdoctoral fellowships

- The genetic determinants of gastrointestinal tract colonization by *Listeria monocytogenes* – Postdoc: Aaron Gall, Department of Food Science, PI: Tu Anh Huynh, Department of Food Science
- Improving health and welfare of dairy cattle by synchronizing and optimizing the transition period – Postdoc: Pedro Monteiro, Department of Animal and Dairy Sciences, PI: Milo Wiltbank, Department of Animal and Dairy Sciences
- Harnessing the power of computer vision systems to improve animal health and welfare in transition dairy cows – Postdoc: Tiago Bresolin, Department of Animal and Dairy Sciences, PI: Joao Dorea, Department of Animal and Dairy Sciences

Equipment

- Near-Infrared Spectroscopy instrument – Joao Dorea, Department of Animal and Dairy Sciences
- Barn video-recording system – Jennifer VanOs, Department of Animal and Dairy Sciences

Ensure animal health and welfare, continued

- Automated feeding equipment – Matt Akins, Department of Animal and Dairy Sciences, Marshfield Ag Research Station

Short term, high impact grants

- Competency of flies (Diptera:Muscidae) to acquire and transmit pathogenic bacteria to dairy cows – Kerri Coon, Department of Bacteriology

Graduate student assistantships

- Improving the performance of dairy heifer operations by understanding maternal and management stressors impacting heifer growth and feed efficiency – Kent Weigel, Department of Animal and Dairy Sciences; Melkaye Melka, Department of Animal and Food Science, UW-River Falls (collaborative)

UW-Platteville

Faculty research fellowships

- Bringing artificial intelligence to the dairy barn – Asad Azemi, Electrical & Computer Engineering; Mehdi Roopaei, Electrical & Computer Engineering; Krista Hardyman, DVM, Animal and Dairy Science; James Hampton, Animal and Dairy Science
- Interactions of fibroblast growth factor and protein metabolism during the postpartum period in lactating dairy cows and their effect on animal health – James Hampton, Animal and Dairy Science; Krista Hardyman, DVM, Animal and Dairy Science
- Nanosculpted silicon membranes for shape-based biological separations – Mark Levenstein, Department of Biology; Gokul Gopalakrishnan, Engineering Physics

Equipment

- Building capacity for dairy nutrition research – Equipment to track individual feed intake – Pete Lammers and Krista Eiseman, Animal and Dairy Science
- Linear rectal ultrasound probe and blood chemistry analyzer – James Hampton and Krista Hardyman, DVM, Animal and Dairy Science

UW-River Falls

Faculty research fellowships

- Analysis and publication of research data on Johne's Disease in dairy cattle – Larry Baumann, Department of Animal and Food Science
- Improving the health and welfare of dairy calves – Sylvia Kehoe, Department of Animal and Food Science
[See profile on p. 19](#)

Equipment

- Super hutches for 2 – 5-month heifers – Sylvia Kehoe, Department of Animal and Food Science; Greg Zwald, UWRF Mann Valley Farm Manager
- Large capacity chilled centrifuge for blood sample preparation – Larry Baumann and Sylvia Kehoe, Department of Animal and Food Science
- Ultracold freezer for long-term storage of blood and tissue samples – Larry Baumann, Sylvia Kehoe and Young Dal Jang, Department of Animal and Food Science
- Fencing project to split milking herd barn from single group to two groups to allow research – Larry Baumann, Department of Animal and Food Science; Greg Zwald, UWRF Mann Valley Farm Manager

Enriching human health and nutrition

UW–Madison

Postdoctoral fellowships

- Whey-fortified fermented milk for inhibiting intestinal inflammation – Postdoc: Yu Hasegawa, Department of Food Science, PI: Brad Bolling, Department of Food Science

Equipment

- Pulsing droplet tensiometer – Rich Hartel, Department of Food Science
- Refrigerated incubators/shaker and plate reader, Tu Anh Huynh, Department of Food Science

Short term, high impact grants

- Glycomacropeptide (GMP) derived from cheese whey: Treating obesity by manipulating satiety hormones and the gut microbiota – Denise Ney, Department of Nutritional Sciences [See profile on p. 18](#)

Graduate student assistantships

Manufacturing natural cheeses containing bioactive peptides with improved antihypertensive properties – Rodrigo Ibanez Alfaro, Center for Dairy Research

UW–Platteville

Faculty research fellowships

- Measuring the rheological properties of ice cream to predict its mouth-feel sensations – Bidhan C. Roy, Mechanical and Industrial Engineering; Tom Zolper, Mechanical and Industrial Engineering

Equipment

- Equipment for measuring the rheological properties of ice-cream to predict its mouth-feel sensations – Bidhan C. Roy, Mechanical and Industrial Engineering; Tom Zolper, Mechanical and Industrial Engineering

UW–River Falls

No awards in this priority area in FY 2020

Human clinical trials often begin with lab animals. Denise Ney works with mice in early phases of her obesity research. Ney (Left) is shown here with Sangita Murali (Right), assistant scientist and researcher in nutritional sciences. Photo by Sevie Kenyon/ UW–Madison CALS.





“ The Dairy Innovation Hub will be transformative in its effect on the Wisconsin dairy community. The ability to do world class, cutting-edge research at our Wisconsin agricultural universities will help provide answers to the bold questions being asked by our farmers and dairy processors. It will help us strengthen our position as the world’s dairy leader, all while providing unparalleled collaboration between our three campuses. I believe we will find new human health benefits from dairy as well as new dairy-based products for our consumers, while at the same time producing them in a sustainable, environmentally friendly way. ”

Mitch Breunig

Mystic Valley Dairy | chairman | advisory council



Photos by Heather White/UW-Madison CALS, Andy McNeill/UW-Platteville, Wolfgang Hoffmann/UW-Madison CALS and Kathy Helgeson/UW-River Falls.



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