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[Logos](https://dairyinnovationhub.wisc.edu/communication-resources/)

[Videos from researchers](https://www.youtube.com/playlist?list=PLohs4ZJkGPyHLpnJDXC5ql3UPTMbw_Wdj)

[Link to this release online](https://dairyinnovationhub.wisc.edu/2021/06/17/dairy-innovation-hub-funds-second-round-of-research-grants-at-uw-platteville/)

**State-sponsored Dairy Innovation Hub funds second round of research grants at UW-Platteville**

The University of Wisconsin­–Platteville recently awarded six faculty research fellowships to help increase dairy-related research capacity through the Dairy Innovation Hub initiative. Known as the Dairy industry – impact and innovation - faculty fellowships or “DI3 faculty fellowships,” selected faculty members will tackle research projects in the Hub’s four priority areas: stewarding land and water resources; enriching human health and nutrition; ensuring animal health and welfare; and growing farm business and communities.

The Dairy Innovation Hub, which launched in 2019, harnesses research and development at [UW-Madison](https://www.wisc.edu/), [UW-Platteville](https://www.uwplatt.edu/)and [UW-River Falls](https://www.uwrf.edu/) campuses to keep Wisconsin’s dairy community at the global forefront in producing nutritious dairy products in an economically, environmentally and socially sustainable manner. It is supported by a $7.8 million annual investment by the state of Wisconsin.

A faculty research fellowship is a temporary position for permanent faculty members. The goal is to provide support for a specific research project and any ancillary costs – including ensuring that the faculty member will have enough time to conduct the research and support for existing teaching responsibilities.

“As we go into our second round of Dairy Innovation Hub faculty fellowships, I continue to be impressed with the projects and ideas being proposed from across our university.  Each fellowship that we fund will have an impact on the dairy community as well as the faculty, staff and students engaged in the research projects,” says [Dr. Tera Montgomery](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2020/05/Montgomery-scaled.jpg), professor of animal and dairy science, who leads the Hub’s UW–Platteville campus steering committee. “The way we ‘do education’ is transformed by funding these fellowships through the Dairy Innovation Hub.”

DI3 Faculty Fellowships are intended to leverage existing UW-Platteville expertise to provide timely results supporting the goals of the Dairy Innovation Hub, with an emphasis on addressing recommendations generated by the state’s [Dairy Task Force 2.0](https://datcp.wi.gov/Pages/Growing_WI/DairyTaskForce.aspx), which completed its work in 2019.

With additional Dairy Innovation Hub support, UW-Platteville recently hired an assistant professor of dairy food science and management. Recipients for capacity-building supplies and equipment have also been selected for funding from the Hub. More information is at [dairyinnovationhub.wisc.edu](https://dairyinnovationhub.wisc.edu/).

The following UW-Platteville faculty fellows were selected for Dairy Innovation Hub funding:

*(Click names for high-res photos)*

***Wood templated high efficiency and low-cost ceramic membranes for dairy wastewater treatment***

**Project Summary:** Wastewater generated from the dairy industry contains high levels of chemical oxygen demand, biological oxygen demand, total suspended solids, turbidity, etc. Direct disposal of such wastewater significantly influences the environment. Ceramic membrane filtration systems can efficiently decrease pollutants, however, manufacturing ceramic membranes is expensive and complicated.This project will use bio-inspired wood templates for a low-cost method to prepare ceramic membranes with high efficiency for dairy wastewater treatment.

[**Dr. Zhezhen Fu**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Zhezhen-Fu-scaled.jpg)**, mechanical and industrial engineering** – Fu is an assistant professor with research interests in manufacturing processes, ceramic materials and mechanical properties of ceramic materials.

[**Dr. Edoardo Rubino**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Edoardo-Rubino-scaled.jpg)**,** **mechanical and industrial engineering -** Rubino is an assistant professor with research interests in the development of optical microsensors for the measurement of electric field, magnetic field and displacement. Rubino previously worked with the Italian Air Force on F16 aircraft maintenance and at the Italian Space Agency on satellite mission design.

***Decision making using DAIRI (Data Automation Interface and Real-time Interaction) – a platform for connecting farmers to their data***

**Project Summary:** The dairy community is undergoing rapid growth and change in data management and analytics. With sensing becoming increasingly accessible and inexpensive, dairies are finding new ways to optimize feed, milk production and bovine health that were not possible less than a decade ago. More technology means more data generated from different sources. This project is focused on understanding how farmers currently use their data to make decisions and analyzing how a decision support framework could influence daily operations to increase herd health and revenue. To accomplish this, a light and efficient web-based platform will be created based on discussion with partner farmers and their consultants. In addition to faculty, the research team includes local farmers and nutritionists to guide platform development and focus on ease of use, essentially getting data to a place where it is more easily stored, analyzed, and used to make decisions about farm management.

[**Dr. Austin Polebitski**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Polebitski-scaled.jpg)**, civil engineering** - Polebitski is an associate professor with a focus on urban and rural water use, water resource systems management, the use of forecasting tools in decision making, and the impacts climate change will have on statewide natural resources. Prior to joining UW-Platteville, he was a research assistant professor at the University of Massachusetts-Amherst and worked for King County's Solid Waste Division.

[**Dr. Arghya Das**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Arghya-Das-scaled.jpg)**, computer science** - Das, an assistant professor of Software Engineering, has his Ph.D. in big data analytics and has multiple years of experiences in data-engineering and data-analysis in both industrial and academic projects. In this project, he will help in requirement analysis, design, implement the analytic pipeline on leveraging the recent advances in cloud and related technologies. He will also help mentoring the undergraduate student for data analysis.

***Performing a risk assessment for the dairy farm***

**Proposal Summary:** Smart technologies are increasingly being adopted on dairy farms to streamline the process of herd management. A variety of cybersecurity threats and attacks targeting the dairy sector have been reported due to the vulnerabilities exposed by smart devices and communications. Such attacks have the potential to cause serious damage that may disrupt the normal operation of a farm, impair the health and welfare of herds, and hinder the growth of farm businesses. The goal of this project is to outline the security posture of the dairy farm at UW-Platteville by performing a comprehensive risk assessment and recommend measures to mitigate identified risks. These findings will be generalized to investigate common cybersecurity issues facing the dairy sector.

[**Dr. Joshua Yue**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Joshua-Yue-scaled.jpg)**, computer science and software engineering** – Yue is an assistant professor with research interests in cybersecurity and software engineering and his research is focused on IoT security, program transformation systems, and domain-specific languages. Yue was the lead in developing the Cybersecurity degree program at UW-Platteville. He has led efforts designing curriculum, developing and teaching new Cybersecurity courses, building a state-of-the-art cybersecurity lab and promoting student enrollment into the new program. Prior to his graduate study, Yue worked in IT and his industry experience in software development and project management benefits his teaching and research.

[**Dr. Ryan Pralle**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Ryan-Pralle-scaled.jpg)**, animal and dairy science** - Pralle is an assistant professor and joined UW-Platteville as a tenure-track faculty member supported by the Dairy Innovation Hub, engaging in research, outreach, and teaching. His research strives to develop data-driven management tools and strategies to optimize the nutrient supply to and the metabolic health of individual cows.

[**Dr. Yanwei Wu**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Yanwei-Wu-scaled.jpg)**, computer science and software engineering** - Wu is an associate professor in computer science and software engineering and teaches in the new Bachelor of Science in cybersecurity program at UW-Platteville which combines penetration testing, malware analysis, digital forensics, and how to counter cyber threats to organizations’ and individual’s data.

***Evaluation of biochar incorporation into manure systems for improving air quality and odor management***

**Proposal Summary:** Manure from dairy facilities impacts water quality, greenhouse gas emissions and odor. Agriculture contributes 50% of global emissions of methane and 80% of nitrous oxide. Additionally, community complaints about odor associated with dairy manure due to ammonia emissions are a common occurrence in Wisconsin. Farmers are looking for a cost-effective method to manage greenhouse gas (GHG) emissions and reduce odor from manure systems. The purpose of this study is to evaluate biochar incorporation into two manure management systems, including manure storages and anaerobic digestion, to reduce production of GHG, mitigate odors and advance economic feasibility of anaerobic digestion by improving biogas quality. The outcomes from this study will improve dairy farms’ environmental stewardship through reduction in GHG production using biochar covers and anaerobic digestion, improve farm relations with surrounding communities by reducing odor, and minimize barriers for a livestock based, renewable energy farm business in rural communities by enhancing biogas quality.

[**Dr. Joseph Sanford**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Sanford.jpg)**, soil and crop science** - Sanford is an assistant professor in the School of Agriculture and faculty researcher for the Dairy Innovation Hub at UW-Platteville. His research interest is in agriculture wastewater management including management of farmstead and edge of field runoff, nutrient management, precision manure application, water recovery and recycling, pathogen inactivation and transport, and emerging agricultural contaminates such as PFAS.

***Leveraging automated milking systems to employ targeted saturated fatty acid supplementation strategies to early lactation dairy cows***

**Proposal Summary:** Dairy cows often experience a negative energy balance during the transition to lactation period, where dietary energy intake is outpaced by the demands of lactation. This early lactation energy deficit puts dairy cows at risk for metabolic disorders like hyperketonemia, which causes reduced productivity, low fertility, greater risk of health problems and ultimately, culling. Saturated fatty acids (FA) have demonstrated potential to improve early lactation cow productivity and health, with higher-yielding cows potentially having more benefit from saturated FA than lower-yielding cows. However, it is difficult to supplement early lactation cows based on productivity because they are often housed in mixed groups. Automated milking systems enable strategic supplementation of feedstuffs like saturated FA to specific cows housed in mixed groups. This project will determine the effectiveness of saturated FA supplementation to early lactation cows for improved cow productivity and metabolic health at different production levels.

[**Dr. Ryan Pralle**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Ryan-Pralle-scaled.jpg)**, animal and dairy science** - Pralle is an assistant professor and joined UW-Platteville as a tenure-track faculty member supported by the Dairy Innovation Hub, engaging in research, outreach and teaching. His research strives to develop data-driven management tools and strategies to optimize nutrient supply and metabolic health of individual cows.

[**Dr. Peter Lammers**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Pete-Lammers-scaled.jpg)**, animal and dairy science** - Lammers is an assistant professor with primary teaching and advising responsibilities in the animal nutrition space. In addition to his academic pursuits, he has also worked with farmers or lead agricultural courses in Ecuador, Mongolia, Ukraine, Uruguay and Vietnam. Lammers’ research interests include novel feedstuffs for livestock, production of livestock for niche markets and integrated crop and livestock production systems.

***Design of a microgrid for the future dairy plant at UW-Platteville***

**Proposal Summary:** A typical dairy plant uses large amounts of energy, and manufacturers regularly seek out opportunities to reduce production costs without negatively affecting the yield or quality of their finished products. On the other hand, having a continuous supply of power is a critical factor in a dairy plant to maintain product quality. A reliable and continuous source of power can be provided by using alternative local energy sources which will also increase grid independence and minimize energy costs. An artificial intelligence-based microgrid can be a solution for dairy plants to reduce energy costs and maintain grid independence by utilizing energy efficiency strategies. The goal of this project is to design an AI-based microgrid for the future dairy plant at UW-Platteville. The proposed microgrid technology would deliver continuous and reliable energy to dairy plant components even when the grid power goes down, minimize energy cost and environmental impacts of electric power generation, and provide a platform for educational as well as research purposes in the area of microgrid from the point of view of various disciplines.

[**Dr. Gholamreza Dehnavi**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Dehnavi_-Gholamreza-scaled.jpg)**, electrical and computer engineering** - Dehnavi is an associate professor and prior to his tenure at UW-Platteville, he worked for eight years at Niroo Research Institute on power electronic and power system projects. He has also worked on microgrid control methods at E.ON Energy Research Center, Germany as a visiting scholar and on PV resources in residential feeders at ABB, US corporate research as a postdoctoral researcher.

[**Dr. Mehdi Roopaei**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2020/05/Roopaei-scaled.jpg)**, electrical and computer engineering** – Roopaei is an assistant professor in electrical and computer engineering. He teaches a variety of courses, and his research interests include artificial intelligence, data-driven decision making and machine learning control.

[**Dr. Xiaoguang Ma**](https://dairyinnovationhub.wisc.edu/wp-content/uploads/sites/252/2021/06/Xiaohuang-Ma-scaled.jpg)**, electrical and computer engineering** - Ma is an assistant professor in electrical and computer engineering. Before joining UW-Platteville, he worked as the communication architect at ABB Inc., a global leader in power and automation technologies, where he focused on the implementation of industrial communication protocols in medium voltage products and systems. He also led research and development projects in communication and cyber security.

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