



# Ag Innovation News

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OVER THE COURSE OF THIS PROJECT, AURI FOUND MINNESOTA'S FOOD AND AGRICULTURE SECTORS TO BE VERY RESILIENT. THEY BOTH EXPERIENCED SUCCESS AND GROWTH WITHIN NEW INTERSECTIONS, WHICH ACCENTUATED PLURALISM AND ENVIRONMENTAL SUSTAINABILITY.

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## EXECUTIVE IDEAS

Every two years AURI conducts a survey among stakeholder groups throughout the state. The goal of this important research is to determine the health of agriculture in Minnesota by identifying specific shared themes of interest or concern. This project takes into account the input from organizations ranging from crop and livestock producers to commodity councils to state agencies and educational institutions. In doing so, AURI can not only gauge the overall sentiment of the sector, but also identify opportunities to support and assist it.

Over the course of this project, AURI found Minnesota's food and agriculture sectors to be very resilient. They both experienced success and growth within new intersections, which accentuated pluralism and environmental sustainability. In addition, we identified a number of common themes shared by these sectors which can help inform future innovation. Some of the most important of these themes are:

**The retractive time during the pandemic led to resilient practices: adaptability, new perspectives, diversification, collaborations and expanding through emerging opportunities.**

These kinds of practices can truly be transformative for any company, regardless of the sector they serve, however this is especially important for the food and ag sectors. As consumer preferences change, successful companies are those that adapt and diversify to meet new realities of their customers.

**Organizations orchestrated relationships through collaboratives while focusing on inclusivity, pluralism and sustainability.**

This theme is worth noting for two reasons. First, the ideas of collaboration, inclusivity and sustainability are at the core of everything AURI does, from hosting events to our work on client projects. Second, ideas that feed into relationships benefit the entire value chain by bringing new people, new ideas and new innovations to the table for the good of all. It's great to see Minnesota's food and agriculture sectors recognize that and make focused attempts to build upon it.

**Organizations focused on local vitality, diversity, robotics and emergent value add opportunities.**

When it comes to food and agriculture, local vitality is of the utmost importance. Without it, communities don't grow or attract new businesses, which negatively impacts the economy and creates an ongoing reduction in local resources. In addition, this leads to low innovation and efficiency, which is key to the other elements of this theme.

**Amid pandemic issues, demand pivots led to successful resilient, effective practices.**

The pandemic has forced us all to become more flexible, nimble and resilient. In some cases this was accomplished by pivoting business operations or production elements, in others it was by seeking out new opportunities and innovations to meet current and future consumer needs. Above all, the level of success seen by the state's food and ag sectors thanks to their resilience is a testament to how seriously they recognized and adapted to changing situations.

In closing, seeing these themes makes me proud and hopeful for the future of food and agriculture in Minnesota and the upper Midwest region. I'm honored to be part of it and excited to see the role AURI can play in the coming months and years.

If you'd like to learn more about these themes, and others we discovered, I encourage you to visit our YouTube channel at [youtube.com/AURIMN](https://www.youtube.com/AURIMN).



By AURI

This quarter, Ag Innovation News highlights its new Board Chair, Federico Tripodi. Currently in his second term on the board, Federico has a long history in the food and agriculture industry. In this edition of AIN's Board Q&A, he shares his thoughts on this new position and what the future holds for AURI.

AIN

How did you first come to AURI? How did you learn about us?

FT

I first heard about AURI from a local colleague in the ag tech space. I was impressed by the depth and breadth of the local innovation ecosystem. There are so many things going on at any given time and AURI seemed to be a trusted connector to help make things happen.

AIN

Why did you decide to run for board chair?

FT

AURI is at a pivotal moment in its history, as is our state's ag-food-energy economic engine. The success of the organization has led to a situation in which the requests for collaboration and the opportunities to multiply our impact to advance our mission continue to exceed the resources we have at our disposal. The other directors and I agreed that my background in innovation leadership and executive governance would serve the board well in this new phase.

AIN

What is your vision for AURI over the next three years?

FT

I envision an AURI in 2025 that is not only capable to support our current customers in new and innovative ways, but also has significantly advanced a few potentially transformative technologies that can put our state at the forefront of innovation and provide us an economic and development advantage, while embracing the past to build the future we imagine.

AIN

What goals do you have for the organization?

FT

We have a great collaborative mission-driven culture and processes in which the staff and leadership drive the goal setting process in collaboration with the board. As the chair, my goal is to continue nurturing and growing this talented group and enhance its deep connections with our state to empower the organization's mission and its impacts.

AIN

What goals do you have for the board?

FT

I see the main roles of any board in an organization like AURI revolve around strategy and governance. On strategy, the board has initiated work to provide more clarity in our strategic vision for the organization in a way that can inform our five-year strategic planning process. The goal of the board is to provide the right framework to help the organization make choices as it plans its goals and focus. This is a collaborative and iterative process with leadership and staff. On the governance front, the board continues to ensure the organization is a good steward of the funds we receive and that it has the right processes and controls to ensure compliance. Another aspect of governance is to continue to attract talented directors and operate as a high performing board.

AIN

How would you describe your leadership style?

FT

As an executive I am an extremely results oriented person. I strive leading in environments where collaboration occurs, and ideas are freely exchanged to advance a common goal. Leaders are a bit like chefs, knowing what amounts of strategy mix well with tactical plans and human and financial capital. Our goal is to maximize the contribution of each ingredient to enhance the final outcome.

AIN

What do you feel is the greatest opportunity for MN value-added ag in the next few years?

FT

I feel the greatest opportunity will be one in which a proven scalable technology meets a megatrend. There are several opportunities the team at AURI has started exploring, including partnerships that I'm excited about. These include the potential to use agricultural products as feedstocks, producing biogas and exploring hydrogen based products for agricultural use. I am also keeping an eye on increasing trends to localize our (food) supply chains, one of the responses to global pandemic disruptions, and better define how regenerative agriculture will impact our production systems.

AIN

What role will you expect AURI to play in the future of MN's value-added ag?

FT

Leader, collaborator, connector, trusted advisor. Given our bandwidth and interconnectivity with other resources in our state and region, I envision our role in building the future will be situational and depend on the needs of the specific space, funding availability and interaction with our overall ecosystem.





# RESEARCH PROJECT SCORES PROTEIN QUALITY OF CULTIVATED WILD RICE

New research into the protein quality of cultivated wild rice grown in Minnesota, sponsored by the Agricultural Utilization Research Institute (AURI), has the potential to open up new markets and new uses for one of Minnesota's most iconic crops.

AURI partnered with researchers at the University of Minnesota's Department of Food Science and Nutrition, the Minnesota Department of Agriculture and the Minnesota Cultivated Wild Rice Council on the project.

Researchers set out to answer three key questions to provide data on the nutritional characteristics of wild rice, its effect on the microbiome and help explain why the product hardens when cooked with sweeteners. Participants say the data gathered is useful for wild rice farmers and marketers who wish to capitalize on the popularity of plant protein-based diets and show that wild rice has health benefits for consumers suffering from a variety of health issues.

There were three main objectives. The first was to determine the protein quality of cultivated wild rice, compared to brown rice, using the protein digestibility-corrected amino acid score (PDCAAS) method. The second was to determine the large intestinal microbial profile, or the gut microbiome of a cultivated wild rice diet compared to a brown rice diet. The third was to investigate why wild rice hardens when cooked with a sweetener like sugar.

The study consisted of feeding rats. One group received cultivated wild rice and a control group received brown rice. At the end of the first stage of the trial, researchers switched diets of each group.

Researchers then collected the rats' feces and tested for nitrogen levels to determine protein absorption rates in each group. Determining how well the rats could absorb the protein provides researchers with a PDCAAS score.

The PDCAAS score is recognized by the U.S. Food and Drug Administration and required in order to make a protein claim on food products.

The results of the study were positive, said Dan Gallagher, a professor of nutrition at the University of Minnesota.

Both wild rice and brown rice had good PDCAAS scores for plant protein sources and had better protein nutritional qualities when compared to other common grains like wheat and barley. Brown and wild rice also had higher PDCAAS scores when compared to common legumes.

The protein quality of cultivated wild rice is very strong, however, the PDCAAS score was impacted due to a lower level of the amino acid lysine. Overall, cultivated wild rice and brown rice have equivalent protein qualities.

There is potential to increase the PDCAAS score of cultivated wild rice using alternative cooking methods. Further, when combined in a food product with other common protein sources like peas and lentils, the overall PDCAAS score of a food product would meet the FDA standards of a good source of protein.

Further, the study showed that in a high fat diet, wild rice greatly reduced cholesterol and total fat in the liver of rats. Liver fat is an early indicator of non-alcoholic fatty liver disease, a serious and growing health issue.

Researchers also concluded that a wild rice diet changed the bacteria profile of the rats and has a positive influence on the microbiome.

There were two observations related to the hardening of wild rice when cooked. First, moisture loss is a main driver for the hardening of wild rice. However, new packaging and cooking methods of cultivated wild rice could help reduce the moisture loss and the hardening of the rice in sucrose.





## THE RESEARCH IS IMPORTANT AND PRESENTS MANY OPPORTUNITIES AND FURTHER AVENUES OF STUDY.

Peter Imle is a cultivated wild rice farmer in northwest Minnesota. He said it is time for the wild rice industry to update its nutritional data as consumers' trends now favor diets with more plant proteins and whole grains.

"Part of the story we hope to tell about wild rice is that it is a healthy protein alternative when compared to other products, but in order to do that, we needed data to support that claim. Now that we have that PDCAAS score it is going to help the industry going forward. It is important for producers and marketers to have this information to inform consumers. This is a great start," Imle said.

Cultivated wild rice is a significant industry in Minnesota. Wild rice is the state grain, and it is the only cereal grain native to North America. Minnesota is the world's largest producer of wild rice.

The Red Lake Nation, for example, operates the fifth largest cultivated wild rice farm in the state," said Beth Nelson, president of the Minnesota Cultivated Wild Rice Council.

"From an economic standpoint, wild rice generates \$58.4 million for the state's economy and 641 jobs annually. Growing wild rice also brings much needed income to some of the poorest counties in Minnesota.

Wild rice production is environmentally sustainable, and the grain is GMO free, gluten free and rich in antioxidants. It is also an excellent source of a healthy diet. In addition to being high in protein, a single serving provides more than half of the daily recommended whole grains, all nine of the essential amino acids and is low in calories. It also serves as an extender in ground beef to reduce fat and cholesterol, improve taste and lengthen frozen storage life. "It really is a super food," Nelson said.

Wild rice is also capital and labor intensive to grow, and the amount of farmable land is finite, said Imle. Cultivated wild rice is grown by a small network of producers when compared to large commodities like corn and soybeans.

Grower groups often allocate funding for production or marketing research which is why collaborative studies like this one with AURI are so important to the industry, Imle said. The council focuses on research that improves productivity and the consumer experience with cultivated wild rice.

"That is where our focus has been from the beginning and where the majority of our check off dollars go," said Imle.

"A project like this with a rat feeding study is very expensive. We are fortunate to have something like AURI in our state. AURI does a great job of filling a niche when a group like ours wants to try something that is a little outside the mainstream. Having an organization to partner with like AURI and its resources means we can investigate some of these issues."

In addition to the protein quantity data, the study also shows cultivated wild rice has the potential to help in a growing health concern, said Gallagher.

"Non-alcoholic fatty liver disease is fairly common in people that are overweight and in people with diabetes. It is a very serious health concern and there is no drug treatment available currently. It is important to try to find a dietary approach that can help combat this issue, especially in high fat diets. If cultivated wild rice can be one of the solutions, that is something we want to pursue," he said.

Gallagher said additional research into the large intestinal bacteria from a wild rice diet is especially exciting. This research was able to prove a wild rice diet changes the bacteria profile, but more research is needed to identify how much the profile changed and what kinds of new bacteria a wild rice diet produces.

"That is significant. Past studies have demonstrated associations with particular bacteria profiles and various health conditions. Issues like colon cancer and even mental depression can be related to the bacteria profile in an individual's large intestine," Gallaher said.

Nelson said the study originated after the council received an inquiry from a food producer asking for wild rice's protein score. The company was exploring using wild rice as an ingredient in cereal bars. The council worked with its producers to refine the request into a formal research project and then contacted AURI to find funding to supplement the council's check off dollars. Ultimately, the council applied for a grant through AURI's Ag Innovation Partnership project. AURI's Lolly Occhino, senior food scientist, and Michael Sparby, commercialization director, worked with the council and the University of Minnesota on this project. Additional dollars came from the Minnesota Department of Agriculture.

"This project just shows that we can accomplish so much more when we can collaborate and work together than we can independently," said Nelson, president of the Cultivated Wild Rice Council. "AURI and all the partners were excellent to work with on this project."

AURI has a long-standing relationship with the Cultivated Wild Rice Council and was eager to continue that work with this important research.

"Wild rice plays a significant role in Minnesota's agricultural community, its past, present and its future. It is a very important crop in our state and adds value to the economy. Any time we can spotlight the industry, assist the producers and potentially find new uses for wild rice, it is a great opportunity for AURI to contribute," said Occhino.





# AG INNOVATOR OF THE YEAR DELIVERS SUSTAINABILITY

**T**he explosion in e-commerce means Americans receive more home deliveries than ever and that trend shows no signs of slowing.

According to Statista, over 20 billion packages were delivered in the U.S. in 2020, which was an increase of 37 percent from 2019. The average American receives 21 home-delivered parcels each year, according to data from Packola.

At the same time home deliveries are proliferating around the world, there's also increasing demand from consumers and companies for increased use of more sustainable materials. The convergence of those issues is helping fuel market opportunities for an innovative Minnesota company.

NewStarch Solutions, based in Plymouth, produces a range of sustainable, biodegradable packaging materials made from plant starches. NewStarch Solutions was founded in 2016 by three partner-owners, Dean Bartels, Matt Niles and Don Niles. Bartels and Matt Niles worked with starch at a previous company before starting their own venture.

"We saw the benefits of starch from a sustainability standpoint and wanted to start a company that would use it as the primary ingredient to create products to replace non-eco-friendly plastics while being competitively priced," Bartels says.

## Sustainable Solutions

Bartels says starch makes a good base material for their products because it is sustainable, plentiful, economically priced and comes from products grown regionally.

All of the NewStarch Solutions products start with resin.

"We blend starches together then run them through an extrusion process to form resin," Bartels explains. "The resin is packaged in 2000-pound supersacks, then loaded on a container or semi-trailer 20 at a time and shipped to customers worldwide to make our finished products."

Products derived from the resin include starch packing peanuts or loose fill. Packing peanuts are typically used for the protection and cushioning of fragile products.

"Traditional packing peanuts are made from polystyrene or Styrofoam, both of which are not good for the environment," Bartels says. "Our packing peanuts are sustainable because they're made from starch."

NewStarch Solutions also produces starch spheres that Bartels says are similar to packing peanuts, but with a spherical shape. These spheres can be used in a range of products from stuffing in a dog chew toy to packaging solutions for shipping sheets of paper or film.





The newest product from NewStarch Solutions is a starch sheet with application ranging from medication delivery to food delivery. Boxes or envelopes can utilize the sheeting as it provides both protection and insulation.

“This is a huge market that is growing,” Bartels says. “It’s largely Styrofoam that lines these boxes, but with a focus on sustainability and the environment, consumers and companies are looking for an eco-friendly alternative. Our starch sheet provides this alternative at a cost that is competitive.”

NewStarch Solutions operates with a unique business model. In addition to providing companies with the resin to make the sheets, NewStarch Solutions also sells the equipment needed to make the sheets. They train customers on how to make the products and then provide parts and service agreements to keep the equipment running.

## AURI Assistance

NewStarch Solutions enlisted the Agricultural Utilization Research Institute’s (AURI) help to develop the biodegradable starch sheet. AURI engineer Riley Gordon worked to help determine the process necessary for production. Gordon conducted various testing needs around product performance while the company tested the sheets for their insulative properties.

The market opportunities for biodegradable sheets that provide both protection and insulation is large and growing. “You can use the sheets for applications like shipping electronics, appliances, medical supplies or other things that need to be kept warm or cold,” Gordon says. “It could be interesting to see all the different markets that could open up with this type of product.”

“We worked with some large packaging companies that are very interested in their products,” Gordon says.

Gordon is also helping NewStarch Solutions navigate the process for becoming green certified. “Once they’re certified, they can then use the Biodegradable Products Institute logo,” Gordon explains. “Customers want that certification because it holds a lot of clout in the marketplace.”

“AURI has been instrumental in helping test our products for thermal insulation and cushioning,” Bartels states. “They also helped us with grants from the Minnesota Department of Agriculture and the Minnesota Corn Growers Association.”

## Biobased Opportunity

Interest in biobased products is growing. AURI’s Executive Director Shannon Schlecht says the U.S. Department of Agriculture added 412 new companies to its BioPreferred certification program in 2021. To date, more than 3,300 companies from 49 countries have secured the BioPreferred certification.

“AURI sees a high degree of interest in biobased, renewable, non-plastic and lower carbon intensity products as well as circular approaches,” Schlecht says. “Packaging continues to be a high interest area for new innovation and NewStarch Solutions falls in the middle of these trend areas, leading me to believe that they and other Minnesota innovators in this space have a bright future if they are solving a consumer or industry problem with a biobased product.”

“The opportunity is global,” Bartels says. “The key is to make it cost competitive with the plastic-based products. When you have both sustainability and cost competitiveness, then you have businesses that are willing to invest time and money into this solution.”

## Ag Innovator of the Year

Since 2002, AURI has recognized a Minnesota company or entrepreneur each year for its innovation and contributions to value-added agriculture through the Ag Innovator of the Year Award. AURI selected NewStarch Solutions as the recipient of the 2021 award.

“New Starch provides an innovative solution that is on point in terms of industry need and consumer trend,” Schlecht explains. “The gap they identified, and solution they explored to produce a biobased packaging material has tremendous potential and they have already seen early success with their efforts. E-commerce and packaging needs have accelerated in the last two years and are expected to grow, while consumer desires for sustainable products are also trending upward. This creates a huge opportunity for early innovators in this space to capitalize on these two trends to rapidly grow market share. It’s great to see agriculture-based starches move into these types of industrial products as an opportunity area that can grow in parallel with the increase in protein demand.”

“NewStarch Solutions is very innovative, and I like their business plan because they have the protection on the process to manufacture their products coupled with them making the resin pellets in one centralized location,” Gordon says. “They’re smart with their business plan, and I can see them growing due to the biobased products market growth in the next 5-10 years.”

Bartels says he appreciates the Ag Innovator of the Year award from AURI.

“It will be wonderful exposure for both organizations,” Bartels says. “We are a small company with limited resources. This will help gain exposure and reach markets and potential customers.”

Schlecht says it’s important to take the time to recognize the forward-thinking companies who have identified opportunities and are striving to pursue them.

“Minnesota is a great place for innovation. AURI has worked on over 1,800 client projects since it was formed in 1989,” Schlecht says. “Highlighting what is going on here to continue to drive innovation among the Minnesota ecosystem is a huge benefit to spur action from others with novel ideas. Recognizing innovation provides a chance to spotlight what is happening here versus other areas of the United States or world to provide insight into Minnesota ingenuity.”



**“AURI has been instrumental in helping test our products for thermal insulation and cushioning,” Bartels states.**



# AURI GROWS SUCCESS WITH A MINNESOTA SOIL & COMPOST COMPANY



To pass the time while stuck at home during the pandemic, many Americans took up new hobbies. People put together puzzles, made sourdough starters, brewed their own beer and exercised in record numbers.

Of all the ways they filled their free time, the most popular was gardening. First time and seasoned green thumbs alike grew their own vegetables, spruced up their lawns and bought seeds for raised beds. The popularity of gardening shows no signs of slowing down nationally with COVID-19 lockdown restrictions having eased.

Over the past year and a half, the Agricultural Utilization Research Institute (AURI) played a role in this by partnering with a Sauk Centre, Minnesota business to develop renewable, all-natural and organic soil and gardening products. Later this year, Kristy Kay Organics will debut new fertilizer, compost and mulch — and the timing couldn't be better.

“People have definitely started gardening more and a lot of people became plant parents,” said Kristy Flowers, the founder and manager of Kristy Kay Organics. “There are so many benefits with gardening from being outside more to growing your own healthy food. It makes sense and people have taken notice.”

Flowers and her husband, Jim, grew up on organic farms. Natural methods of growing plants, free from chemicals, have been a lifetime passion for both. They started their company with a desire to save the planet through the pursuit of sustainable environmental practices and to introduce people to the benefits of natural gardening methods. Beautiful grass, vegetables and flowers can be created in an environmentally sustainable way. Kristy Kay's makes its products with simple, all-natural elements.



Healthy soil treated with chemical free fertilizer can continue to grow and capture carbon dioxide keeping it out of the atmosphere and groundwater, Flowers said. According to Kristy Kay, feeding the soil beneath grass with beneficial, chemical free fertilizer can potentially capture between 46.0 to 127.1 grams of carbon per square meter per year.

About 18 months ago, Flowers contacted AURI seeking assistance to develop the new products. Alan Doering, AURI's senior scientist for coproducts, and Harold Stanislawski, AURI's business development director, were assigned to the project.

Doering and his team conducted analysis on new organic fertilizer, compost and mulch products. The organic compost is the "heart and soul" of the business, Flowers said. The company recently formed a partnership with a local chicken farmer to add manure pellets to the mix. They also produce products specific for vegetable and flower gardening.

AURI's scientists helped identify the right base products. In order to meet the standards for organic labeling, the new products must contain certain levels of nitrogen, phosphorous, potassium and other materials. Finding the right mix that is producible, affordable and in bulk was the biggest challenge with this project, Doering said. Work for this project was conducted at AURI's labs in Waseca and Marshall.

"Kristy is very focused and dedicated to soil health. She wants to use products that will grow beautiful plants but also those that will lead to better quality soil, air and water," Doering said. "Many of the organic fertilizers you see on the market don't have the high levels of nitrogen that you would find in other, nonorganic products. The fun part was finding the right ingredients to meet nitrogen performance levels."

Kristy Kay Organics is in a competitive marketplace and one of the company's main distinguishers is the organic nature of its products. Therefore it was important to focus on utilizing products that are both economical and can meet the nutrient requirements, Doering went on to say.

Flowers said she discovered AURI by doing research into funding partners as well as research and development sources. She is very happy she found AURI. Using the analysis from AURI, she will be able to launch new mixes specific for vegetable gardens and flower gardens. Currently, the company sells straight to consumers from the website. Flowers plans to make her products available at local businesses as she continues to expand and as conditions in the global supply chain improve.

"We have always used our own recipes and formulas to make our products. One thing we always wanted was to work with a scientist to make sure the product was as healthy and environmentally friendly as we thought it was," Flowers said. "Alan and Harold toured our facility and took a sample back to the lab for testing. I can't say enough positive things about [AURI]. They are the friendliest people you could imagine working with."

The biggest advantage of working with AURI, Flowers said, was the organization's access to equipment that she would otherwise not be able to use.

"Anytime we thought we hit a roadblock [during the testing] the team at AURI would talk us through the issue. They were always honest and optimistic. Sometimes I would ask Alan a question and he would tell me, 'I don't know, but I will do research and get back to you with an answer.' To have that resource was very helpful," she said.

Doering and Stanislawski also understood the bottom line of the business, Flowers said. The team was able to identify less expensive options for base materials that yielded the same results in testing as more expensive ingredients, thereby saving money on production costs.

In addition to testing and analysis for the organic fertilizer, AURI also provided guidance on labeling and general business questions. For example, Kristy Kay Organics has bagging equipment at their facility in Sauk Centre and AURI worked with Flowers to increase efficiency and improve the process.

Stanislawski noted the team at Kristy Kay Organics was very driven and focused on their goals throughout the process. They are competent, savvy businesspeople. They are also collaborative.

Flowers is also exploring the possibility of partnering with other local businesses to use the bagging equipment when it is not in use for her products. "Whenever we can, we want to support local businesses," she said.

**"They were great clients to work with. While they were new to the fertilizer and mulch products they wanted to develop, they know business," Stanislawski said.**

"They know how to manage people and understand the issues that come with having a growing business. They have been through the regulation and certification process before as well, so they know what to expect. That familiarity and experience made it a very smooth process."

Flowers said she hopes to continue the working relationship with AURI. There is an opportunity to advise on pelleting, business networking and to help the company find new financing resources for additional equipment purchases. Her next goal is to produce an organic lawn fertilizer and sell it in hardware and home and garden stores.

"That is where we think we can do the most and have the biggest impact. Everyone wants to have that beautiful front lawn and you can do that with organic products. People love the idea of a natural lawn fertilizer because they know it is safe for their kids and their pets. But consumers need to be able to afford it. That is what we are working on next," she said. "People are starting to realize now that organic farming and organic gardening is good for the earth. And if we take care of the earth, the earth will take care of us. If we can get the perfect mix of organic lawn fertilizer out in the market, that will just make a huge difference."

Working with Kristy Kay Organics highlights the breadth and depth of service that AURI can provide to clients by working across the entire organization, Stanislawski said.

"The success we had with Kristy just shows that when we can cross pollinate within AURI's different disciplines we can really accomplish a lot for clients. A project like this brings the full resources and expertise of AURI together," he said. "When we work with a client like Kristy Kay that is on a journey of constant innovation and really understands what it means to run a business, the sky is the limit."



# AURI Launches Revamped Entrepreneur in Residence Program



Entrepreneurs contribute to economic growth by creating new products and services, which stimulate new employment and economic development. These new businesses also create entry-level positions and help nurture skilled workers.

In addition, entrepreneurs generate innovative ideas that open the door to new opportunities, products, and technology. And in many cases, find solutions to problems that existing products and services have not yet solved.

For these reasons, the Agricultural Utilization Research Institute (AURI) is launching a revamped version of its Entrepreneur in Residence Program (EiR). Founded in 2016, EiR is a comprehensive program to catalyze and support small businesses and entrepreneurial innovation in value-added agriculture. Through this new version of the program, qualified entrepreneurs will benefit from AURI's equipment and expertise. Like all of AURI's clients, participants in the EiR will have access to AURI's laboratory facilities and meet regularly to confer and strategize with AURI staff and scientists throughout the duration of the residency. Some participants may even be eligible to receive a small stipend for qualified expenses related to using AURI's lab facilities.

The relaunched program may provide cost-share support to entrepreneurs in their efforts to obtain non-dilutive funding through grants from federal, state and other public or private entities. While some research and development grants may not allow financing for laboratory space and facilities, or may require matching funds, AURI can help increase the likelihood of grant awards by providing qualified entrepreneurs with a source of in-kind match funding.

"Sometimes one of the most challenging early tasks in proving a new concept is to access specialized equipment and expertise," said Dr. Luca Zullo, AURI's Senior Director of Science and Technology. "For instance, a biomass energy entrepreneur may need access to commercial-grade biomass densification equipment and technical insight to move their idea from concept to a proof of concept, which may be suitable to attract investors. That access may be difficult and expensive to source for an entrepreneur, especially when one is trying new high risk high reward concepts. We aim to reduce that gap, and we want the entrepreneur, when possible, to leverage AURI's contribution as a match against public and private grants."

## Participation and Qualified Entrepreneurs

The EiR program is open to businesses organized under the laws of Minnesota or with a principal place of business in the state. Those expected to benefit the most from the program are pre-revenue, small businesses, although AURI may consider other entrepreneurs depending on circumstances. "The Entrepreneur in Residence Program is well suited to entrepreneurs that have the necessary topical technical expertise and a basic understanding of laboratory operations and equipment use," said Shannon Schlecht, AURI Executive Director.

To optimize the use of limited laboratory and staff resources, AURI will limit the number of concurrent EiR projects, with a preference for residencies of no more than eight months in duration. To be eligible for AURI's services, program candidates must benefit Minnesota's agricultural sector while demonstrating the potential for positive impact on Minnesota's economy and be commercially viable. Additionally, a candidate's products or processes must fit within one of AURI's four focus areas: Food, Coproducts, Biobased Products and Renewable Energy.

EiR candidates must also demonstrate the capacity and intent to continue commercializing their idea upon residency completion. Finally, EiR candidates must provide a work plan, as well as a business plan with a budget that reflects their ability to support the project during residency, and their strategy to continue its funding beyond EiR.

"There is a large opportunity cost associated with the funding of access to equipment, expertise and facilities at the earliest stage of a venture. Our aim is to reduce this and allow the entrepreneur to focus on investing what they have (sweat-equity and ideas) rather than what they do not (hard cash)," said Zullo.

Interested entrepreneurs are required to submit an application package. AURI will accept applications year-round and they will be reviewed regularly by staff. Additional information or clarification may be requested during the review process.

For more information on the application process and to request a packet, email [EiR\\_request@auri.org](mailto:EiR_request@auri.org).

## EiR Program Areas of Support

AURI will make available laboratory space, facilities, lab services and specifically identified equipment needed to advance the project toward commercialization. Entrepreneurs in Residence will have access to AURI's Coproducts lab in Waseca and its Analytical Chemistry, Bioproducts and Food and Meat Processing lab in Marshall. These facilities will assist in product and process development, scale-up, nutritional assessment, pilot production line development and production for market assessment.

In addition, while the EiR is engaged in the program, AURI staff will provide assistance and expertise on technical soundness and quality of product and process development, analytical testing, product formulation, evaluation and testing of the product, prototype development, sourcing of ingredients and feedstock, choice of materials, equipment and services selection, market suitability and prospects and commercialization viability.

We want to lower the economic barrier needed for them to pursue their idea. At the early stage, this type of program can be particularly valuable.

To learn more about AURI's Entrepreneur in Residence program, visit [auri.org](http://auri.org).

**The EiR program is offered in partnership with Minnesota State University, Mankato's Mainstreet Businesses Focused on Food and Agriculture initiative (MBFFA).**



# AURI is Looking Forward in 2022



The Agricultural Utilization Research Institute (AURI) strives to be a leader in value-added agricultural product innovation to help foster long-term economic benefit for the state of Minnesota. One of the key components of being a leader is remaining at the forefront of agricultural trends. Three of the trends agriculture experts believe will help shape the industry in 2022 include: Regenerative Agriculture, Renewable Energy and Sustainable Proteins. AURI is supporting several collaborative partnerships that highlight these trends.

## Regenerative Agriculture

Today, major food and beverage companies are counting on regenerative agriculture to help meet sustainability goals, and many farmers continue to adopt conservation efforts to do their part.

AURI is working closely with the University of Minnesota's Center for Integrated Natural Resource and Agricultural Management's Forever Green Initiative. Forever Green is working to develop and identify the next generation of crops, specifically winter annuals and perennials, that can fill the so-called "brown period." Cover crops such as pennycress, winter camelina and Kernza® perennial grain are gaining attention in the Midwest to reduce erosion and promote soil health.

One of the innovators AURI is partnering with on Kernza is Gwen Williams, owner of Artisan Naan Bakery in St. Cloud. Together, a pilot project was launched to produce naan made from Kernza flour to sell in store. The project was a success, and the bakery produces wholesale Kernza naan and bread products for retail markets across the Minneapolis-St. Paul metro region.

## Renewable Energy

Innovations in the field have produced more cost-efficient ways to capture and retain clean energy, leading to a boom in the industry. This expansion is occurring on both large and small scales, from biomass processing to rooftop solar to wind farms. AURI is working on a variety of initiatives and projects within the renewable energy sector.

## Green Ammonia & Green Hydrogen

Green Ammonia and Green Hydrogen refer to the production of ammonia and hydrogen that is 100 percent renewable and AURI is working with the University of Minnesota on green ammonia as an energy source for agricultural uses. Green ammonia has many uses as an energy source – it can run grain dryers and illuminate and heat homes and commercial buildings. It can also be used as a fertilizer, and can become fuel to power a tractor or vehicle.

## Biofuels

Biofuel is produced through contemporary processes from biomass rather than fossil fuels. The two most common types of biofuels are ethanol and biodiesel. Ethanol is derived from various plant materials and used as a blending agent with gasoline to increase octane and reduce emissions. Most ethanol is derived from plant starches and sugars but developing technologies will allow for use of plant fibers. Renewable diesel and sustainable aviation fuel are two emerging biofuel areas.

## Biogas (Anaerobic Digestion)

Biogas is a type of biofuel produced from the decomposition of organic waste. Food scraps and animal waste are broken down in an anaerobic (non-oxygenated) environment and a blend of gases is released. In 2020, CenterPoint Energy, Minnesota's largest natural gas utility proposed state legislation promoting innovative clean energy resources and technologies to reduce greenhouse gas emissions and advance Minnesota's clean energy future. The Natural Gas Innovation Act would establish a state regulatory policy allowing a natural gas utility to add alternative fuels, such as renewable natural gas and hydrogen gas, to its distribution system. A utility could also deploy new energy-efficiency and carbon-capture technologies to reduce or avoid greenhouse gas emissions from natural gas use.

## Sustainable Protein

Protein is an essential macronutrient needed by the body to fuel growth and maintain optimal health. It helps build muscle, repair tissues and provide energy to sustain life. Unlike other macronutrients in the body, protein reserves are not stored and must be consumed regularly to maintain good health.

With the world's population approaching 8 billion, a major shift in food consumption behavior and the scarcity of natural resources, the question of how to feed more people while also protecting the environment is being addressed at both global and local levels. An emerging solution to these challenges is the cultivation of more sustainable sources of protein.

Producing proteins in a way that is affordable, healthy and beneficial for the environment is an important need, and includes both sustainable animal-based products and plant-based products.

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## MBOLD Accepting Applications for Bold Growth Program

MBOLD is excited to announce it is accepting applications for the next cohort of its Bold Growth: Scaling for Success in Food & Ag program.

Effective scaling by high potential companies is vital to the future of Minnesota's food and agriculture ecosystem. The Bold Growth program accelerates the success of selected high-growth food and ag companies through tailored support from members of the MBOLD coalition and allied businesses.

Bold Growth was launched in 2021 to accelerate the success of high-growth Minnesota businesses and provides individualized support to address critical needs chosen by each cohort member, such as planning for their next growth horizon, vetting key business opportunities, honing their value proposition or growing financial resources while navigating the choppy waters of scaling up. The program targets post-accelerator companies with an annual revenue of \$5 million - \$20 million that have strong potential for growth.

This MBOLD program is led by Grow North and the Agricultural Utilization Research Institute (AURI), and welcomes Launch Minnesota as a supporter in 2022.

Eric Hall, CEO of So Good So You and member of the 2021 cohort, said, "We've had a phenomenal experience with Bold Growth. MBOLD spent a lot of time getting to know our business and what we were trying to solve for. They facilitated connectivity and sustained engagement by the right corporate leaders – people we wouldn't have had access to otherwise. They were incredible partners. This program has helped us take our business to a whole new level."

MBOLD will collaborate with successful applicants to identify each company's unique needs and will design a 12-to-18-month engagement plan to support those needs. It will also secure ongoing advisory support from pertinent experts within MBOLD's network to assist businesses where they need it most.

MBOLD is accepting applications from April 1 - April 30, 2022. Encouraged to apply are Minnesota-based businesses that advance a compelling food or ag innovation aligning with MBOLD's mission to accelerate solutions to environmental sustainability and the growing global demand for food. There is a particular interest in high growth, innovative businesses in the protein space that are making meat and dairy proteins more sustainable or advancing plant and novel proteins. MBOLD is committed to advancing equity in food and ag entrepreneurship and encourages Black, indigenous and persons of color, as well as women-led businesses to apply. MBOLD is an initiative of GREATER MSP.

**To learn more about the Bold Growth program and how you can apply, please visit [MBOLD.org](https://mbold.org).**

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