MEAT SCIENCE & ANIMAL BIOLOGICS DISCOVERY
1933 OBSERVATORY DRIVE
MADISON, WI 53706

Meat Science & Animal Biologics Discovery Quarterly

Meat Science & Animal Biologics Discovery
UNIVERSITY OF WISCONSIN-MADISON

VOLUME 2, ISSUE 4 SUMMER 2024

INSIDE THIS ISSUE:

Words from the Director: Steven Ricke

We have now completed the spring semester at the University of Wisconsin 2024 and I want to congratulate our graduating graduate and undergraduate students as they embark on the next phase of their life whether it be a job, entering a professional school, or graduate school. We at MSABD are extremely proud of them and wish them the very best! Now with the summer of 2024 rapidly approaching we at MSABD are getting prepared for extensive travel to scientific meetings both domestic and abroad. Several of our graduate students and undergraduates will participate and present their research work at conferences and scientific meetings over the summer months. Likewise, MSABD faculty will be attending scientific meetings as invited speakers and meeting organizers. Regardless of who is attending we all serve as ambassadors for MSABD, the Department of Animal and Dairy Sciences and the University of Wisconsin-Madison. This representation is important as it not only showcases our accomplishments but serves as an excellent marketing tool for recruitment of topnotch graduate students and postdoctorates to our research programs. Once again, we had several visitors that toured our program including Wisconsin State Senator Brad Pfaff, North American Meat Institute officers and staff, and the UW-Madison Office of Federal Relations and government staffers from Washington D.C. All were excited to tour the MSABD facilities and offered high praise for the work we are doing at MSABD. Dr. Robin Anderson a Research Microbiologist and Lead Scientist at the USDA-ARS Food & Feed Safety Research Unit in College Station, TX gave an invited MSABD seminar entitled "*The Search for Strategies to Reduce the Carriage and Dissemination of Foodborne Pathogens and Antimicrobial Resistance in Animals and Their Production Environment*" which led to numerous discussions with students and faculty on current mutual interests and future potential collaborations. The MSABD seminar series has continued to be a great way to not only learn what research our colleagues at other institutions are conducting but also introduce them to our capabilities for potential future collaborations. Our former MSABD students continue to shine and make us proud. Dr. Aaron Bodie, a former Ph.D. student at MSABD has been named Stop Foodborne Illness's "40 under 40" list of rising stars that are becoming leaders in food safety. Congrats Aaron! Finally, we want to introduce you to our newest MSABD staff members, Heather Hunt, an outreach specialist for the MSABD Extension program, David Pertzborn, maintenance technician, and Matt Finch, the new Varsity Meat's assistant retail manager. Welcome Heather, David and Matt! In closing we look forward to an exciting 2024 summer at MSABD. Have a wonderful summer!

Current MSABD Personnel:

Faculty:
Dr. Steven Ricke, Professor & Director
Dr. Wei Guo, Assistant Professor Meat Science & Muscle Biology
Dr. Mark Richards, Professor Meat Science
Dr. Vanessa Leone, Assistant Professor Animal Biologics & Metabolism
Dr. Jim Claus, Professor Meat Science
Dr. Jeffery Sindelar, Professor & Extension Meat Specialist
Dr. Sara Gragg, Associate Professor

Post Doctorates and Scientists:
Dr. Koeun Hwang, Scientist (Dr. Claus)
Dr. Elena Olson, PostDoc (Dr. Ricke)
Dr. Zachery Gregorich, Scientist (Dr. Guo)
Dr. Samar Tolba, PostDoc (Dr. Leone)

Sirui Zhang, MS (Dr. Gragg)
Yaqin (Ya Chin) He, PhD (Dr. Guo)
Dillon Walker, MS (Dr. Claus)
Yanghai Zhang, PhD (Dr. Guo)
Siyuan (Steven) Sheng, PhD (Dr. Claus)
Md Amran Gazi, (Dr. Leone)
Kellen Marcum, MS (Dr. Gragg)
Sara Irizarry Rodriguez, MS (Dr. Sindelar)
Ashley Tarcin, MS (Dr. Ricke)

Staff:
Dillon Walker, Plant Operations Manager
Kadence Senkowski, FSQR Manager
Max Sell, Retail Operations Manager
Matt Finch, Assistant Retail Manager
Cindy Austin, BSL2 Lab Manager
Laurie Sand, Research Program Coordinator
Colleen Crummy, Outreach Program Manager
Heather Hunt, Outreach Specialist
John Licari, Building Manager
David Pertzborn, Maintenance Technician
Dan Mechenich, Administrative Assistant
Therese Thompson, Plant Production Lead

Graduate Students:
Adam Franzen, MS (Dr. Claus)
Sean Baker, PhD (Dr. Richards)
Margaret Costello, MS (Dr. Ricke)
Jessica Brown, PhD (Dr. Ricke)
Alyssa Seitz, MS (Dr. Sindelar)
Jake Hermanson, PhD (Dr. Leone)
Zihan Zheng, MS (Dr. Guo)
Dawson Stroik, PhD (Dr. Guo)
Napatsawan (Pat) Pharino, MS (Dr. Claus)
Alejandra Abrego Gavidia, PhD (Dr. Gragg)
Evan Chrisler, PhD (Dr. Leone)
Russell Mcminn, PhD (Dr. Sindelar)

Attention Readers: We would like your feedback on MSABD Quarterly! Please consider what feedback you might have for us as you read through the newsletter and then let us know your thoughts by clicking any of the "Submit Feedback Here" links throughout the newsletter. **Thank you!** This will help us make MSABD Quarterly more engaging and suited to your interests.

Submit Feedback Here

New Course Offered At MSABD

Beginning this fall, a new meat themed undergraduate course will be offered at MSABD. Titled "Introduction to Culinary Meat Science", the course covers a wide variety of topics and is designed to improve students' skill in and scientific understanding of the culinary arts - food preparation, cooking, and presentation - as they relate to meat. The 20 or so students expected to enroll will meet once a week for a lecture and hands-on lab facilitated by industry professionals who carry out the topic for a living. Potential guest speakers include many of MSABD's partners, including individuals from Kerry, Johnsonville, American Foods Group, the Wisconsin Association of Meat Processors, Driftless Provisions, The Meat Block, and the American Meat Science Association.

The course will be taught by MSABD Director and Professor Dr. Steven Ricke, Extension Youth Livestock Specialist Bernadette O'Rourke, and MSABD PhD student Jessica Brown. Jordan Nehls, former Food Safety, Quality, and Regulatory Manager at MSABD, provided input on the creation of the course. Also contributing were MSABD's Heather Hunt and Dr. Jeff Sindelar, who cover many of the same topics as Introduction to Culinary Meat Science in their Extension workshops and short courses.

By covering a large variety of topics, Introduction to Culinary Meat Science exposes students not familiar with meat science to the many behind the scenes opportunities and potential careers common to the meat industry. Students will examine microbiology applications in food safety and regulatory landscapes. The students will also explore the business side of things, from supply chains (such as those of fresh meats and farm-to-plate restaurants) to marketing. Students will investigate the nutritional value of meat products and consider their labeling. The students will also delve into the product development integral to Wisconsin's tradition of providing artisanal (value-added, like charcuterie boards) and ethnically representative (German, Polish, Norwegian, etc.) meat products, as well as other research and development efforts, including that on meat alternatives. The exploration of meat product development uncovers opportunities in consulting, like those in Wisconsin's Value-Added Food and Farm Business Counselor Program. To make sure meat products meet consumers' expectations, students will learn about sensory analysis.

More traditionally, students in the course will learn the ins and outs of preparing and cooking a variety of meat products and serving them in a variety of settings. One lab is scheduled to demonstrate the different methods of cooking beef, while another promises to make fresh sausage in MSABD's Hawkins Discovery Lab. All things chicken – batters, breading, marinating, and frying – is the subject of another lab. Other labs will address smoking meats and creating charcuterie boards. From grocery store shelves to restaurant tables to cafeteria buffet lines, the importance and logistics of how food and meat products are presented to consumers is covered in yet another lab.

In the past few decades, Madison and many other places have seen an explosion in the number of craft breweries, farm-to-plate restaurants, and food trucks. Much like the new Fermented Food and Beverages Certificate in the Department of Food Science at UW-Madison, Introduction to Culinary Meat Science captures the public's growing interest in its food.

Zambian Delegation Visits MSABD

On April 29, a delegation of VIPs from Zambia visited CALS and were hosted by CALS Global Director Dr. Jennifer Kushner. As part of their visit, the delegation and Dr. Kushner visited MSABD for a tour of the USDA inspected processing plant. The group also met for introductions with MSABD Director Dr. Steven Ricke before the tour. The group's visit was mentioned in the most recent CALS Global newsletter, Global Glimpses Spring 2024.

MSABD was very pleased to host Dr. Kushner and the Zambian delegation and develop new relationships. As was mentioned in a recent issue of the MSABD Quarterly newsletter, MSABD also recently hosted the Chilean Minister of Agriculture, Dr. Esteban Valenzuela, and a delegation from Chile. Prior to that, MSABD played host to a Swiss delegation from the Consulate General of Switzerland in Chicago, IL.

The agricultural sector of Africa is rapidly evolving and shows the potential for tremendous growth. Stay tuned to future issues of the MSABD Quarterly newsletter and the MSABD website for articles and Program Features examining the meat industry in Zambia and other global perspectives.

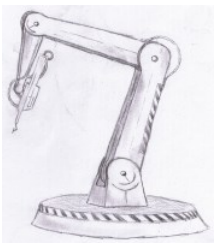
Camp Randall Concession Stand

Bucky's Varsity Meats operated a concession stand at Camp Randall during Badger home football games for a second consecutive season this past fall. The stand was located near midfield in Section FF on the upper deck. Brats and bacon cheeseburgers made in the processing plant at MSABD were available for purchase.

North American Meat Institute Visit

Last November, officers and staff of the North American Meat Institute (NAMI) toured MSABD. Their visit coincided with NAMI's last meeting of the year, where the President and CEO of NAMI, Ms. Julie Anna Potts, handed over the reins to her successor. Mr. Steve Van Lannen of American Foods Group, LLC here in Wisconsin has been serving as Chairman of NAMI. The NAMI group met with MSABD faculty Dr. Steven Ricke, Dr. Vanessa Leone, and Dr. Sara Gragg for introductions and discussion before being led on a comprehensive tour of the building by MSABD's Dr. Jeff Sindelar.

Automation, Robotics, AI, & Machine Learning



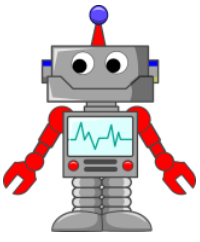
There is a lot of development taking place in the meat industry at present involving robotics and a subfield of AI, or artificial intelligence, known as machine learning. One application of robotics is in meat fabrication. A concern is that a robot will not be, say, as skilled as a human in removing meat from a bone, thus increasing waste. Over time, using machine learning, the robot improves its skills. It learns through repetition more about the input (meat on the bone) and the output (meat that has been filleted) and recognizes patterns and connections in going from the input to the output. The robot also learns from human teachers when it has done a good job and when it has done a bad job. Besides the benefit of reducing the risk of human injury, the robot, with adequate skills, can boost production in processing plants.

Here in Wisconsin, the Wisconsin Association of Meat Processors (WAMP) held a pre-convention workshop, called Technology & Automation Working for You, at MSABD ahead of WAMP's annual convention in Middleton, WI. The workshop included representatives from various meat processing equipment manufacturers from across the United States, who demonstrated various automation technologies. The demonstrations resulted in several meat processors in attendance purchasing new equipment. This equipment will help them overcome labor shortages and meet the high demand for meat products in Wisconsin.

Despite some limitations and potential risks to be managed, machine learning and other iterations of AI have many exciting potential applications. This is the case not only in the meat industry, but increasingly in all areas of life. There is a good chance the average person encounters at least some form of AI on a daily or weekly basis, from improved maps on Google to grammar checkers to fraud monitoring on their card transactions. Another way many have interacted with AI is through chatbots such as ChatGPT.

To incorporate a little AI into MSABD Quarterly, ChatGPT was asked to tell a joke about meat science. It responded with the question below and the answer on Page 10!

Q: Why did the meat scientist become a vegetarian?



Dr. Sara Gragg Named To Beef Industry Food Safety Council Executive

Dr. Sara Gragg, who joined the MSABD faculty in August 2023, was recently named to the Beef Industry Food Safety Council Executive Committee. Her appointment fills the "Academia" seat on the committee and begins in 2024. According to the Beef Industry Food Safety Council website, the council "…brings together representatives from all segments of the beef industry to develop industry-wide, science-based strategies to solve beef safety challenges." With her appointment to the committee, Dr. Gragg further diversifies and expands her impact on food and meat safety.

> *I was fortunate to sort of fall into food safety as a high school student and it stuck. I fell in love with it.*
>
> - Dr. Sara Gragg in 'Amazing' facilities attract Gragg to UW-Madison by Jim Massey

Dr. Gragg continues to already positively impact MSABD and UW-Madison and has appeared in several university publications. In March 2024, Dr. Gragg and her research were covered in the Department of Animal & Dairy Sciences newsletter in an article by Jim Massey. Then in the April 8, 2024 edition of eCALS, the weekly news email from the College of Agriculture and Life Sciences (CALS), Dr. Gragg was the new faculty profile. Dr. Gragg was also appointed Associate Director of MSABD in February. To see Mr. Massey's article and the new faculty profile on Dr. Gragg and learn more about her and her research, please visit:

'Amazing' facilities attract Gragg to UW-Madison
New faculty profile: Sara Gragg studies food safety issues affecting the meat industry

The current members of the MSABD Social Committee are listed below. The committee organizes and coordinates the MSABD End O' Summer Block Party and MSABD Holiday Potluck, as well as other social events like March Madness watch parties.

Laurie Sand	Sean Baker	Jessica Brown	Jake Hermanson	Koeun Hwang
Alejandra Abrego	Zach Gregorich	Erica Kallas	Heather Hunt	

PhD Research: Russ Mcminn

Russ Mcminn did not intend to return to school to finish his PhD when he left UW-Madison in December 2019. Feeling isolated writing his dissertation, Russ was excited to take a position with Alkar-RapidPak in Lodi, WI. After a two-year hiatus, Russ joined MSABD in January 2023 to finish his PhD in Dr. Jeff Sindelar's lab and brings with him a wealth of knowledge and a historical connection to meat science at UW-Madison.

Originally studying the classics – Greek and Latin – as an undergraduate at UW-Madison, Russ switched his major to biology his sophomore year. He gravitated towards the microbiology aspect of biology, and, after realizing he met the requirements for both, double majored in Biology and Bacteriology. Before graduating, a bunch of brewing equipment was donated to UW-Madison, and Russ was one of the first students to take a new brewing class. Russ was stunned and dejected though when several owners bluntly told him to stay away from the beer industry. Russ pivoted and found an enjoyable work environment for the next several years at UW-Madison's Food Research Institute (FRI) under Dr. Kathy Glass and Dr. Kristin Schill.

It was at FRI that Russ first met Dr. Sindelar, who was a primary investigator on a research project taking place there. Dr.

Sindelar had funding available to continue the research, and Russ started his PhD program in 2013. Russ was now at the Muscle Biology Lab (MBL) and Dr. Marion Greaser, who had retired just a few years prior, was still a regular sight in the building. The research focused on the USDA-FSIS Appendix A and thermal processing of meat products. In fact, Russ's research led directly into the research done by another graduate student of Dr. Sindelar: Jordan Nehls, who graduated Spring 2023 and worked as Food Safety, Quality, and Regulatory Manager at MSABD.

While working on his PhD the first time, Russ intended to follow in the footsteps of his predecessor in Dr. Sindelar's lab, Dr. Amanda King, who worked at the Oscar Mayer plant in Madison. The closure of the plant in 2017, along with the stress of grant writing, also played a role in Russ's decision to take the position at Alkar. As much as he enjoys the variety, collaborations, and informal, fun environment found in industry, Russ's true passion lies in teaching, and he is currently an adjunct instructor at Madison Area Technical College. Russ decided to return to school when he realized a PhD gave him the best chance for teaching.

Already done with his research and most classes, Russ is preparing for his preliminary exams and hopes to have his dissertation done by Spring 2024. Until then, he will continue to help Dr. Sindelar book speakers, budget, and otherwise prepare for Extension programming at MSABD. And – like Dr. Sindelar, Dr. Mark Richards, and Dr. Jim Claus - reflect on his past at the MBL, present at MSABD, and the strides meat science has taken at UW-Madison with the arrival of MSABD. Russ recalls taking the initiative and ordering the mobile drink cooler used at Extension programming today while at the MBL, which replaced a whole process involving moving coolers filled with ice from the basement of the MBL to the top floor, where they were wielded through narrow hallways to be filled with drinks.

P.S. Russ successfully defended his PhD in June 2024. He has since joined the lab of Dr. Sindelar as Lab Manager and will support the high-impact research initiatives the Sindelar Lab and meat science Extension at MSABD are known for.

Wisconsin Senator Brad Pfaff Visits

This past October, Wisconsin Senator Brad Pfaff visited MSABD. PhD student Jessica Brown led the senator on a tour of the building while discussing her research before they met with MSABD Director Dr. Steven Ricke for a discussion. In other roles before becoming a senator, Mr. Pfaff helped bring MSABD to fruition. During the tour, he quickly grasped the work MSABD does.

Senator Pfaff maintains many additional connections to UW-Madison. He has already met with Chancellor Jennifer Mnookin, and the senator participated in the 2022 UW-Madison Day at the Capitol. This event is an opportunity for those engaged in the research that makes UW-Madison famous to share their work with the legislature. Senator Pfaff also formerly served on the Committee on Universities and Revenue. Finally, Senator Pfaff's two children have attended UW-Madison.

Himself graduating from UW-Green Bay and then George Mason University, Senator Pfaff grew up on a dairy farm northeast of La Crosse, where he learned the importance of soil science biology. An accomplished public servant, Senator Pfaff also has experience in soil science, biology, animal care, production, business, and crops. In his distinguished career, Senator Pfaff served before as a congressional staffer, a county board supervisor, and was appointed to federal and state positions in the President Obama and Governor Evers administrations.

MSABD and Senator Pfaff share many goals in common. They include creating new agricultural research and market opportunities and making quality education and economic opportunities available. Several companies have used MSABD's pilot plant to develop new products and Extension programming at MSABD provides a place for small meat processors to learn how to develop and produce high value artisan products. Meat processors are found in 68 of 72 Wisconsin counties, and over 20 are located in Senator Pfaff's District 32. MSABD has several current funding initiatives and new technologies in place to enhance experiential learning for its students and increase enrollment while hiring additional faculty and staff to further research solutions to issues facing the meat industry. MSABD graduates are well qualified to take high paying supervisory and research roles in the meat industry, and additional supervisors will allow processing plants to use flex scheduling to provide workers with a work/life balance while maintaining production schedules. From these efforts to 4-H and FAA youth education, to helping Wisconsin's Tribal Nations reach food security and sovereignty, to ensuring meat products are safe to eat,

MSABD joins Senator Pfaff in working to make a stronger Wisconsin.

After the tour and discussion, MSABD reached out to Senator Pfaff to get his impressions and answers to a few questions.

What initially sparked your interest in visiting MSABD?

Wisconsin is an animal agriculture state. Animal agriculture is the ultimate value-added, providing our farmers with revenue, our main streets with important food service jobs, and our consumers with a variety of healthy food choices.

What does it mean to you to tour MSABD, a resource to Wisconsin and project you helped bring about?

UW – Madison is an economic engine for our state. Investing in a state-of-the-art meat lab and processing facility benefits our family farmers, communities, and consumers.

Was there something you saw or heard during your visit to MSABD that gives you hope for the future?

This facility will help move Wisconsin forward in agriculture food production, food processing, advanced food technology, and important research and development.

MSABD's New Staff:

Heather Hunt, David Pertzborn, & Matt Finch

Last August, Heather Hunt joined MSABD as an Outreach Specialist with Extension. Prior to MSABD, Heather earned a Masters degree from Penn State University, where she helped with that university's meat science and muscle foods Extension programming. Heather is already a familiar face in the meat industry and at many meat conferences. Welcome Heather! A special welcome also to David Pertzborn, MSABD's new maintenance technician, and Matt Finch, who joins MSABD as Bucky's Varsity Meats' new Assistant Retail Manager. Keep an eye out for more information on David and Matt in the next issue of MSABD Quarterly.

The MSABD booth at Process Expo in Chicago (October 23—25, 2023). It was a chance for MSABD to display information about the building, program, USDA Plant, BSL2, and extension activities.

John Licari Celebrates 10 Years

This past November, MSABD Building Manager John Licari celebrated 10 years of service at UW-Madison. John previously worked just down Observatory Drive at the Biotron Laboratory. At MSABD, he plays a critical role keeping the research equipment in the labs and the processing equipment in the plant maintained. He also keeps infrastructure such as the wastewater decontamination system, smokehouses, and refrigeration systems operating. Setting up, taking down, and offering an extra set of hands during, he helps keep various events at MSABD running smoothly. John has brightened many days with a warm greeting. In his spare time, John enjoys playing in bands and fishing.

Undergraduate Spotlight: Hannah Kerber

Hannah Kerber recently took an interest in meat science and works as an undergraduate student employee in the MSABD processing plant. She next received the Wisconsin Livestock and Meat Council Scholarship at the Wisconsin Meat Industry Coalition Conference last November. Congratulations Hannah! Hannah was sent several questions to get to know her and her story better, and her answers are below.

What are you studying here at UW Madison?

I am studying Animal Sciences Business emphasis.

How did you learn about MSABD and come to apply for a job there?

I learned about MSABD through the animal sciences 305 lab (Meat Science). The labs piqued my interest in meat processing, and I wanted to pursue the opportunity to gain experience in the lab.

What are some of the most interesting things about meat science to you or what are some meat science related topics you are hoping to learn more about?

Some of the most interesting things about meat science include how harvest practices and proper animal handling can improve meat quality.

What has it meant to you to meet and network with some of the important figures in Wisconsin's meat industry at the Meat Industry Coalition Conference?

Networking at the Meat Industry Coalition Conference was a very valuable experience as I was able to meet people in all sectors of the livestock and meat industry and learn about their individual roles. The people who spoke and attended the conference provided inspiration for a career and invaluable connections for my future.

If there was one thing you wished all your fellow students at UW-Madison knew about MSABD, what would it be?

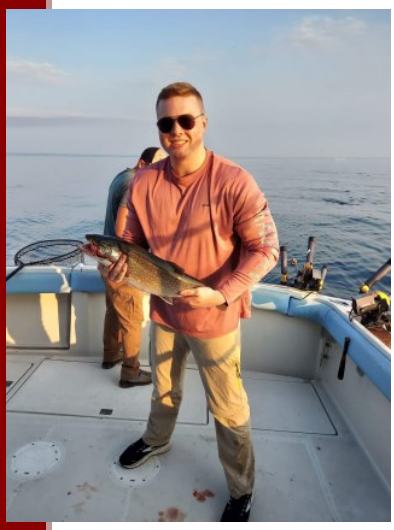
I wish there was more knowledge of the industry connections and skills that are taught at MSABD. The skills can be applied across many industries outside of animal science and open many opportunities for students to learn and make connections.

Masters Research: Adam Franzen

Written by Erica Kallas - Student Outreach Specialist

Research at MSABD is constantly striving to improve the quality of meat products. Masters student Adam Franzen, a member of the lab of Dr. Jim Claus at MSABD, shares this same sentiment. Adam's research looks at the tenderness and color of lamb and sheep meat after the meat has been exposed to Adam's enhanced vascular rinse and chill process. Adam is nearing the end of his research project and plans to defend sometime later this year (please keep an eye on the MSABD website for the announcement of his defense seminar).

Adam's enhanced rinse and chill process has several potential components, adding a solution to reduce the heme-iron favored by dangerous pathogens, a helpful virus known as a phage that infects and helps control dangerous pathogens, or a calcium chloride solution to speed the beneficial aging process in the meat. The control for Adam's research is the current Rinse & Chill ® vascular rinse treatment without any of Adam's additives. Rinse & Chill ® (developed and owned by MPSC Inc.) is USDA approved and widely used commercially in the United States and Australia.



With Adam's additives, the calcium chloride rinse activates certain enzymes responsible for meat aging, helping to tenderize the meat. If more enzymes are activated, the rate of the tenderizing can be enhanced. Adam's research has shown the calcium chloride solution achieves the same improvements in tenderness that conventional aging achieves in one to two weeks in as little as three days postmortem. This has the potential to speed up the production process and reduce costs.

In addition to rinse and chill processes, Adam is studying applying an electric shock to meat to quickly reduce the pH level of the meat. Typically, the pH of meat goes from neutral (7) to 4-5 eventually. With electric shock, the pH drops from 7 to below 6, the ideal level for meat quality, in mere hours. The process burns freely available ATP and induces rigor mortis, which helps avoid the cold shortening that can reduce meat quality. Both electrical shock and calcium carbonate applications have been known about for a long time, but it was not commercially feasible to implement them until recently. Adam and other researchers alike are on the forefront of realizing these technologies and making them commercially feasible.

Adam's research is driven by a desire for food safety, but also to create products that people want to buy. Some previous efforts to improve meat with other vascular rinse additives resulted in the meat turning very red, which made the product unappealing to many customers. So far, this has not happened to the products treated with Adam's additives. Off-the-record subjective sensory analysis showed some people preferred the flavor of the meat treated with Adam's new additives versus meat treated with the control. And lab results show that the meat treated with the calcium chloride solution variation was objectively more tender.

Adam's drive for research began far before MSABD. Adam's undergraduate education at UW-Platteville was all-inclusive and very applied; he learned not only about meat sciences, but also animal nutrition, genetics, and more. Adam also had an internship at Weber Meats in Cuba City. After receiving his undergraduate degree, Adam reached out to professors at Iowa State and UW-Madison about graduate programs. He was drawn to Dr. Claus's research, but there was insufficient funding to support Adam full-time. As a result, Adam paid for a few credits out of pocket and initially attended part-time. The Dennis R. Buege Meat Science Endowed Student Assistance Scholarship, which Adam received in 2023 (MSABD Quarterly Volume 2, Issue 3 – Page 12) was instrumental in allowing Adam to attend UW-Madison full time and further his meat science education.

Adam's experiences in the classroom contributed not only to the development of his research, but also his dedication to MSABD. Adam was a TA (teaching assistant) for Dr. Claus in ANSCI 305 Introduction to Meat Science and Technology and ANSCI 515 Commercial Meat Processing. Doing so required a lot of preparation, and at some point Adam had to know as much as Dr. Claus! Adam learned much from teaching, and he came into the role with a strong awareness of what students need to be successful in the courses, his own undergraduate education having been disrupted by the pandemic.

Additionally, Adam facilitated activities for younger students, from teaching third graders how hot dogs are made, to showing seventh graders sheer force testing and colorimeter readings at a STEM camp. These outreach opportunities were very rewarding for Adam, as he was able to introduce meat science to the next generation of scientists.

To Adam, being a MS student is an exercise in organization. As the student is the one in charge of the research, it was Adam's responsibility to ensure that his project remained on track and that the right kinds of data were being collected along the way. Adam's advice for other students is to keep an open mind - keep trying things, and if you do not like something, there will be something else to try that might be what you like.

After graduation, Adam hopes to continue working in meat quality and with his hands in a harvest facility. Adam believes in the strengths of the meat industry and wants to be a part of the outreach that bridges its honorable work with the public. Adam's experiences at MSABD, along with his sincerity and warmth, set him up for a bright future and career in the meat industry.

What is your go-to meal to make on the grill?

Grilling season is upon us! What is your go-to meal to make on the grill? Let us know in the Google Form linked above, and we will publish the results in the next issue of MSABD Quarterly.

Did you know that in addition to a great selection of meat products, Bucky's Varsity Meats also carries a range of seasonings and rubs to put the final touch on your dish? Ask Max for advice on pairings!

MSABD at the Animal & Dairy Sciences Classic Annual Golf Outing

MSABD students, staff, faculty, industry partners, and friends converged on University Ridge Golf Course in Verona, WI for the 2024 Animal & Dairy Sciences Classic golf outing Tuesday, May 14. Along with the MSABD End O' Summer Block Party, typically held in early September around the beginning of the new semester, the Animal & Dairy Sciences Classic is one of the major annual social and networking events for MSABD.

There was a new option this year for registering a team that includes a "Department Celebrity" - a student or member of the staff or faculty from the department or MSABD - to golf 18 holes and spend the day with you. What topics of discussion you have with the celebrity are up to you! The outing is a scramble format, so you do not need to worry about being a great golfer. So why not make memories on a beautiful golf course in Wisconsin in spring while supporting a worthwhile cause?

Other opportunities to socialize and network exist for those who truly want nothing to do with a driver or putter. Following play, there was a brat cookout at 3 PM featuring brats and hamburgers made right at MSABD's very own Bucky's Varsity Meats. If that is not a conversation starter, then what is?!

Proceeds from the event go towards undergraduate student scholarships and high impact learning experiences. Things like field trips and travel to competitions get students out of the classroom and create the experiential learning that UW-Madison meat science pioneers like Dr. Robert Kauffman knew were so important.

For more information, please contact the Golf Outing Team at andyscigolfouting@ansci.wisc.edu. Registration options in 2024 started at $175 for a single golfer and included opportunities for sponsor signage at the tee. Portions of each registration are tax deductible.

We hope to see you at the 2025 Animal & Dairy Sciences Classic!

Digging Deeper: Meat Science Lexicon

oxidation (ˌäk-sə-ˈdā-shən) *noun* 1. The loss of an electron from a molecule. In myoglobin, the heme iron is converted from the red pigment ferrous (Fe^{2+}) state to the ferric (Fe^{3+}) state due to the loss of an electron resulting in the brown, metmyo-globin pigment (Cornforth and Jayasingh, 2004).

> Raw beef needs to be exposed to oxygen to achieve the bright red color familiar to customers and seen in cases in meat shops like Bucky's Varsity Meats. This is because beef that is not exposed to oxygen, like that in a vacuum sealed package, will be dark red or even purple. Beef that has been in an oxygen free environment can turn bright red in as little as 15 minutes after exposure to oxygen. Beef that continues to be exposed to oxygen and to undergo oxidation eventually turns brown. According to the USDA "Beef that has turned brown during extended storage may be spoiled, have an off-odor, and be tacky to the touch and should not be used."

emulsion (i-ˈməl-shən) *noun* 1. A mixture of two immiscible liquids, one of which is dispersed in the form of small droplets or globules within the other liquid (i.e., homogenized milk). A fat-in-water emulsion or meat batter is created when lean tissue and fat tissue are mixed together in the presence of salt via high-speed cutting. The resulting emulsion is often described as a batter, especially in raw form. Examples of emulsified products in final form include frankfurters and bologna.

> The size of the particles in an emulsified meat product vary, but are generally on the scale of the width of a human hair or a sheet of paper.

Holiday Potluck 2023

The MSABD community gathered last December for a holiday themed potluck. The MSABD Social Committee decorated the mezzanine landing before, and Jordan Nehls prepared a prime rib as the main course. Many different kinds of cookies and a good time were had by the attendees. Events like this potluck allow faculty, staff, and students to relax, make new connections, and reflect on successes and accomplishments.

MS Defense: Alyssa Seitz

On Thursday, January 11 MSABD graduate student Alyssa Seitz successfully defended her MS thesis. Her research looked at the effect different feeds have on meat characteristics and quality in dairy-beef crosses. Please see Page 5 of Volume 2 Issue 3 of MSABD Quarterly for more background on Alyssa's research. While considering her next step, Alyssa will continue to manage a dairy farm with her fiancé in northeast Wisconsin.

Congratulations Alyssa!

Left: Alyssa explains her research during her defense seminar.

Right: Committee member Dr. Matt Akins introduces Alyssa and her research.

End O' Summer Block Party

Students, staff, faculty, collaborators, and friends of MSABD gathered last September after work to start the semester on a good note at the End O' Summer Block Party at MSABD. Dr. Jeff Sindelar and Food Safety, Quality, and Regulatory Manager Jordan Nehls, along with student help, roasted a pig for the event and attendees played cornhole and other yard games set up in the building's atrium lobby. The gathering was a chance for everyone to enjoy some camaraderie, welcome many new faces to MSABD, and hear a few fun anecdotes from MSABD director Dr. Steve Ricke's distinguished career. Turnout was strong, and included those who made the walk over from the Animal Sciences Building.

Dr. Ricke To Speak At One Health Research International Symposium

Dr. Steven Ricke, professor at and Director of MSABD, was scheduled to speak at the International Symposium on One Health Research: Improving Food Security and Resilience April 21 – 23 in Galveston, Texas. His talk is titled "*Salmonella* Ecology and Pathogenesis in Poultry: Impact on One Health Bacterial Disease Concerns and One Health Solutions. The conference is associated with the University of Texas Medical Branch, which has its main campus in Galveston.

One Health is a concept that recognizes that it will take experts from many different disciplines and organizational entities to address food security and the complex and interconnected public, animal, human, and environmental health problems that threaten it. One such threat is in the form of emerging infectious diseases, including the *Salmonella* Dr. Ricke will speak about. The breadth of the symposium is seen in the "beef, dairy, egg & poultry, pork, aquaculture, fresh produce, and processed food" producers, as well as the "leaders in agricultural industry, public health, veterinary health, food safety, and environmental health institutions" that are also scheduled to be in attendance. The conference is an opportunity for these experts to find common ground in their work that will become the basis for new research collaborations that provide potential solutions to health problems and promote food security.

To learn more about the symposium and view an agenda, please visit: UTMB Health's Agenda & Speakers webpage.

Interdisciplinary Sustainability

CALS Global recently released its 2024 call for proposals for the Global Research & Outreach (GRO) Award. Per the CALS Global website, the GRO Award seeks to "advance sustainable agriculture and the life sciences through a focus on food systems decarbonization, water sustainability, novel agronomic systems, feeding the world through plant biology, promoting healthy aging through gut microbiomes & nutrition, and preventing vector-borne diseases." An article about how MSABD contributes to more conventional environmental sustainability appeared in the last issue of MSABD Quarterly (Page 16). Nonetheless, sustainability has many contexts and is defined in many different ways, and with the GRO Award criteria, MSABD's work in biologics and the gut microbiome and in food safety is seen to also contribute to sustainability. Such connections show the highly interdisciplinary nature of MSABD's research and how the program provides solutions to problems not only for Wisconsin, but also for the global community.

In Case You Missed It

With falling temperatures and the holidays around the corner, for many it is the perfect opportunity to cook up a batch of hearty booyah. The dish, which features cuts of chicken and beef or pork (and sometimes all three!) and various vegetables and seasonings, is a tradition in northern Wisconsin, as well as in Minnesota and the Upper Peninsula of Michigan.

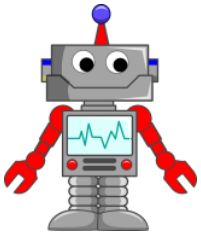
Booyah is thought to have roots with the Walloons, a group of French speaking people from Belgium northeast of Paris, who immigrated to the United States in the mid 1800s. In fact, booyah, along with several other similar words for several other similar dishes in Minnesota and Michigan, is thought to be a variation of the French word "bouillon", which translates to broth in English and is frequently used in English countries (e.g. bouillon cubes). A newspaper article published in 1976 speculates the term booyah was first used in Green Bay, WI. Suitably, Green Bay's Northwoods League baseball team was named the Green Bay Booyah for the 2019 and 2020 seasons. Booyah is sometimes prepared in huge batches, such as in 50 gallon steel or cast iron kettles, and served at social gatherings, of which can also be referred to using the term booyah.

Either way, there is no time to delay, as booyah can take up to two days to make, simmering the whole time. Visit Bucky's Varsity Meats for the chicken, beef, and pork you will need, and check out Melissa Belanger's booyah recipe at her Simply Whisked by following the link in the red box below!

Melissa Belanger's Traditional Wisconsin Booyah Recipe

This story originally appeared as a Program Feature on the MSABD website last December. For more Program Features, please visit: Program Features on the MSABD website.

Source: Bully for booyah: Belgian soup-stew is a cherished tradition around Green Bay



A: Because they couldn't handle the pressure of working in such a high "steak" industry!

Academy of Cardiovascular Research Excellence Symposium

In June 2023, Dr. Wei Guo hosted at MSABD a pre-conference symposium for The Academy of Cardiovascular Research Excellence (ACRE) at the International Society for Heart Research – North American Section (ISHR-NAS). The 42nd Annual Meeting of the ISHR-NAS took place the following four days in downtown Madison at the Monona Terrace Community and Convention Center. The meeting was titled "Advancing Cardiovascular Health by Enabling Technologies and Translational Research". The conference brings together cardiovascular scientists from around the world; the 43rd meeting will be in Long Beach, California.

The pre-conference symposium hosted by Dr. Guo at MSABD started with remarks from the president of ACRE and the president of ISHR-NAS and featured five 23-minute lectures on cardiovascular related topics. After the lectures were ten 12-minute oral presentations on selected abstracts from the following 42nd annual meeting, including abstracts from Dr. Zachery Gregorich and Yanghai Zhang from Dr. Guo's lab. Their abstracts are listed below.

Zachery Gregorich, University of Wisconsin-Madison, Madison, USA
Proximity labeling proteomics uncovers the putative mechanism of disrupted RBM20 nuclear import in RBM20 cardiomyopathy (ISHR-NAS Abstract # 45)

Yanghai Zhang, University of Wisconsin-Madison, Madison, USA
Disruption of RS domain function in RBM20 is causative in dilated cardiomyopathy (ISHR-NAS Abstract # 12)

The evening ended with dinner and a social.

Dr. Guo joined MSABD in 2020 in part to further meat science at UW-Madison and search for biologics. Dr. Guo studies the way muscles grow and work. According to his lab's website, the Guo Lab is "[particularly] focused on the role of RNA binding proteins in alternative splicing and protein transport in heart muscle diseases (cardiomyopathies) as well as skeletal muscle hypertrophy and regeneration using both in vitro and in vivo approaches."

1st CAAC Vascular Biology and Disease Agenda

Dr. Wei Guo also hosted at MSABD the 1st Chinese American Academy of Cardiology (CAAC) Vascular Biology and Disease Agenda conference last August 11 - 14. The event was co-organized by Dr. Guo and Dr. Bo Liu of the School of Medicine and Public Health at UW-Madison. Topics for the meeting included atherosclerosis and inflammation; aortic aneurysm and peripheral artery diseases; endothelial cell biology, angiogenesis, and lymphangiogenesis; and epigenetics, transcriptomics, and proteomics in cardiovascular diseases. The event marked the first meeting of the CAAC.

Over two days, 21 twenty-minute talks were given, including talks by Dr. Guo and Dr. Liu. The two days also included round table discussions and academic socials. There were also plenty of opportunities to network at evening dinners; during a trip to Memorial Union to sample local beer, Babcock ice cream, and other snacks; and on a two-hour Betty Lou cruise of Lake Mendota.

The CAAC Vascular Biology and Disease Agenda conference shows how relevant Dr. Guo's research in biologics and muscle growth and development is to research in human disease and vice versa. The conference also shows the interdisciplinary nature of Dr. Guo's research and the many collaborations he has not only at UW-Madison, but with researchers based all around the world.

Travelin': Destination Italy

Last August, two graduate students, Jessica Brown and Elena Olson, and two staff, Jordan Nehls and Heather Hunt, from MSABD traveled to Padova, Italy to attend the 69th International Congress of Meat Science and Technology (ICoMST). Elena and Jessica used their MSABD International Travel Award and Allen International Graduate Scholarship to support their travel.

The group landed in Italy's capital city, Rome, on August 15, which was the national holiday, Ferragosto. The holiday is a day of rest for those in the agricultural sector and when the Catholic church celebrates the Virgin Mary. The group joined the celebration by going straight to Vatican City after dropping off their luggage at their AirBnB. The MSABD travelers also visited the Trevi Fountain, Colosseum, and other historical monuments in Rome. Salumerias, shops which sell salumi products almost exclusively, and other markets seemed to be on every corner of the cobblestone streets the groups explored. Although there was a language barrier, the group was able to learn about the traditional, Italian meat products for sale by talking with owners of salumerias and other markets. They learned that many meat shop owners in Rome work directly with a harvest facility outside of the city, increasing the level of traceability for the raw material sources of the products they sell.

As the group continued through their journey of visiting nearly every salumeria they could, they gazed wide-eyed at the dry-cured products which decorated the ceilings, walls, and shelves of the shops. Though many products seen were similar to those available and produced in the United States, the artisanal qualities of the traditional, Italian salumi products set them apart. Many processors in the United States take a much more industrial approach to manufacturing salumi products, which rushes the process to meet the demands of American consumers. In contrast, processors in Italy cherish the traditionality of products and will allow products to hang upwards of a year and will not heat treat the products. This process preserves the unique and distinguishing flavors of the old-world salumi products.

The group divided as they left Rome. From Rome, Elena and her cousin ventured on an agri-tourism route, which took her through the heart of Italy's famed Tuscany region. Most of the people off the beaten path in Tuscany speak very little English. Fortunately, Elena's cousin lives in Italy for part of the year and was able to translate for Elena. The countryside struck Elena as serene compared to the bustle of Rome and just the same as the Italian landscapes portrayed in the 2010 movie Eat, Pray, Love starring Julia Roberts.

While in Tuscany, Elena learned about how the Italian government gave struggling farmers money to turn their farmhouses into villas to host tourists, creating a new agri-tourism industry in the region. The program was an effort to protect and keep alive Tuscany's local culture and cuisine, and Elena found the locals were eager to talk about the transition to agri-tourism. When Elena and her cousin ate at restaurants, they saw many menu items, such as pigeon, that are unusual to the cuisine they are used to. Off the beaten path and with no other foreigners around, Elena saw a traditional side of Italy and enjoyed learning about the values the people there hold dear.

Jessica and Heather joined friends from other universities and took a more conventional path on their journey north. From Rome, they traveled to Florence, where they went on a Vespa tour through the Tuscan countryside. The scenes before Jessica reminded her of the 2003 movie Under the Tuscan Sun, which she watched before traveling to Italy.

The vespa tour was completed with a tour of a winery and olive oilery. At the winery, they learned about what qualifies a wine to be sold as an official Tuscan wine, how long wine has been aged at the winery, and how what material the wine is aged in, such as the terracotta jars at the winery, impacts the flavor profile of the finished product. At the olive oilery, they saw how the olives are pressed by stones and how many olives are needed to make a little oil. They learned that the region's olive harvest is a community event, during which community members pick the olives by hand. The group enjoyed the oil and wine so much they had some shipped back home. Prior to these tours, the group knew that wine and oil were stereotypically important to Italian culture, but now they have a greater appreciation for the role these foods play in forming cultural identity and sense of place.

Based on a recommendation, the group dined at a restaurant called Tavernetta after returning to Florence after their vespa tour. As they walked up to the restaurant, the group drooled over the display case which featured huge steaks. Compared to those in the United States, the steaks at Tavernetta have very little marbling, very little external fat, and a larger ribeye area. The group took a moment to interview the twenty plus year veteran chef that stood behind the display case who told them about the most tender cuts before he learned that the group was made up of meat scientists. As they conversed with the chef, they ordered Bisctecca alla Fiorentina, or Florentine, which is a very thick-cut t-bone, and picked out a 45-day aged 4 kg steak from the display case to share five ways. The chef put the steak on the wood-fired stove behind him and prepared their meal. The steak was brought out to their table whole, and sliced into pieces at the table, which exposed that the steak was perfectly prepared!

After dinner, Jordan arrived in Italy and joined this group in Florence. Another cultural difference with the United States is some Italians tend to eat dinner later in the day – sometimes as late as 10 PM! In some places, shops will close in the afternoon before reopening in the evening. After perhaps a nap, people are out and about in the evenings, giving Italy its famous nightlife. The group had experiences with starting appetizers around 8 PM before eating dinner around 10 PM. Despite Jordan's late-in-the-day appearance, she still got to enjoy the night life with the group that evening. (cont'd)

While in Florence, the group also toured the beautiful Florence Cathedral and Mercato Centrale, an indoor market in the center of the city. Florence Cathedral, built between 1296 and 1436, is a UNESCO World Heritage Site. Officially named Santa Maria del Fiore (Saint Mary of the Flower), Florence Cathedral is typically referred to simply as duomo – which in essence translates to cathedral. The cathedral is the 4th largest in the world. At Mercato Centrale, the group found lots of fermented and dry-cured meats hanging from the ceiling and on display.

As they admired the products on display, the group could not help but order a tray of salumi products to try. The tray had a variety of products, including mortadella (with its signature fat cubes giving the meat a polka dot appearance), prosciutto, and a variety of salamis, fruits, and cheeses. Elena even bravely tried the carpaccio, which is a type of raw meat. Unlike other European meat products steeped in history, carpaccio was invented recently in 1963 by a bar owner in Venice. After leaving the market, the group visited the Statue of David by Michelangelo and other pieces of art in the Accademia Gallery. The Statue of David, acknowledged worldwide as a masterpiece, was even more mesmerizing and beautiful in person.

Leaving behind Tuscany to the south, the group arrived by train in the Emilia-Romagna region of Italy. There, they embarked on a bus trip to tour Prosciutto di Parma, Parmigiano Reggiano, and Traditional Balsamic Vinegar manufacturers. Their first stop was the Parmigiano Reggiano manufacturer. Many local cheese makers are family-owned businesses and receive milk twice a day from local dairies. Like wine, cheese takes on different flavor profiles with aging, and in older cheeses, the cheese begins to crystalize, giving it a crunchy texture. The group sampled a variety of Parmigiano Reggiano that varied in age. The cheese takes its name from the Italian provinces of Parma and Reggio Emilia. If parmesan cheese does not hail from this region of Italy, the product cannot use the name "Parmigiano Reggiano". The tour group was led into the aging room, where large wheels of Parmigiano Reggiano are regularly tapped with a little hammer to check for crumbling, which is indicative of possible spoilage in the interior of the wheel. The process of Parmigiano Reggiano manufacturing is a craft, and requires a long journey of knowledge intake as an apprentice under an established and experienced cheese maker.

The group next toured a Prosciutto di Parma processing facility. Prosciutto refers to ham that is dry cured instead of being cooked or smoked. Like many traditional products, the name "Prosciutto di Parma" is protected, and must be made in the Emilia-Romagna region, which contains the city of Parma. The processing facility contained two large aging rooms, with meat hanging on wooden scaffolding from ceiling to floor. The group had fun guessing how much the stored meat was worth and acknowledging the art and craftsmanship it takes to make these products. Heather openly admitted she got slightly emotional being surrounded by nothing but Proscuitto di Parma. (cont'd)

Making It Happen!

Much of the work MSABD does helps provide solutions to the problems facing the meat industry in Wisconsin and beyond. Sometimes the connection is winding and not very direct. For example, federal spending funds a grant to study a problem facing the meat industry as a whole and MSABD is just one of many entities receiving a portion of that grant money. Other times the research helps inform future research and adds to the overall understanding of science. While these efforts are as important as any, it is harder to put a finger on the exact results.

Some MSABD efforts, however, have a very obvious cause and effect. Such was the case with the two Basic HACCP short courses and the Advanced Food Safety School held recently at MSABD by Dr. Jeff Sindelar's Extension program. In response to new meat processing facilities opening in Wisconsin and an increasing number of untrained new employees, these short courses and school provided food safety training to 105 meat industry workers who received certification with the International HACCP Alliance.

The need and solution are clear enough that Dr. Sindelar's Extension program received just over $350,000 from the Meat Talent Development Program at the Wisconsin Department of Agriculture, Trade, and Consumer Protection. This investment does much to "support the viability and growth of Wisconsin's meat-processing industry."

One question frequently received on tours of MSABD is a variation of "*How often are there harvests at MSABD?*". The answer is "It depends!". Some weeks there are no harvests, while other weeks there are several. Most of the harvests at MSABD are associated with research projects and driven by their timelines. This is why the fresh meat selection at Bucky's Varsity Meats varies from week to week. Very occasionally MSABD will have a harvest to provide product for Bucky's Varsity Meats to meet demand. Sometimes harvests are scheduled for hands-on demonstrations, such as the Animal Harvest & Product Utilization School of the Master Meat Crafter program or FFA meat judging contests. Regardless of the reason for the harvest, each one provides learning and hands-on experience for the undergraduate workforce at MSABD.

Elena Olson presents at the International Production & Processing Expo in Atlanta, GA.

The group next arrived by train in Venice, named "The Floating City" for its quintessential canals. Although there are plenty of gondola boats, there are no cars in the main part of Venice, which meant the group got their workout hauling their suitcases through the streets and over little bridges in about 100°F heat. Throughout the trip, the group said they walked about 10 miles a day! In addition to a gondola boat ride, Jessica and her accompanying boyfriend Josh attended the opera. Part of the group took a water bus to a few nearby islands to tour the blown glass and lace industries the islands are known for. Elena began to sense a feeling of animation and enjoying life in Italy, and she took some pictures of people she thought exemplified this feeling. Meanwhile, Heather and Jordan explored some of the shops in Venice, toured churches, put their feet in the Canal Grande, and went to Harry's Bar, where the peach bellini was invented and has been the go-to spot for celebrities like Ernest Hemingway, Charlie Chapin, Frank Lloyd Wright, and Katherine Hepburn to enjoy the drink since the 1930s.

Finally, in Padova the group attended the 69th ICoMST. ICoMST is held in a different country each year and a unique aspect of the program is that it changes to best reflect the host country's meat industry and culture. The process of determining the next host country is very informal, with one country stepping up to make sure a Congress takes place. A central theme of the Congress is for attendees to leave with new skills, vantage points, and relationships spanning the globe.

Dr. Andy Milkowski is adjunct faculty at MSABD, formerly of Oscar Mayer in Madison, and host of the seminar where Jessica and Elena shared the information in this article (a salami from Bucky's Varsity Meats was served in honor of the traditional Italian meats encountered during the trip). He explained that Oscar Mayer was an advocate for sending its managers to attend conferences like ICoMST. The managers had great people skills and were leaders, but sometimes fell a bit short in regard to meat science. Living up to the central theme of ICoMST, the managers learned enough meat science to answer the questions their teams back at Oscar Mayer had working in a processing plant. Understanding this legacy, Dr. Milkowski continues to encourage those interested in travel awards (such as the International Meat Science Travel Award, Gale Prince Travel Award, and the John Cerveny IAFP Travel Award) to apply for them.

Topics covered at the 69th ICoMST included meat science technology, communications, and education. Different meat alternatives were covered as well, from vegetable-based meat alternatives to lab grown meat. A major topic at this year's ICoMST was the discipline of "omics" and how it can be utilized in the meat industry. Omics is generally divided into four major branches: genomics, transcriptomics, proteomics, and metabolomics. Jessica found it interesting how researchers were starting to use a combined approach to address real world issues, even things like biodiversity.

One thing that struck Elena was how the researchers at ICOMST were very candid. Researchers discussing plant-based meat alternatives talked about how they were paid to speak by companies working on plant-based meat alternatives. The researchers also brought up themselves some of the health concerns, such as poor digestibility and lack of vitamins, associated with plant-based meat alternatives. Those researchers working on lab-grown and cultured meat talked about how those products currently have a scaffolding issue (i.e. poor texture) and are currently banned by Italy. Finally, the researchers working on insect-based sources of protein, which tend to receive more attention in Europe versus the United States, examined the nutritional content of insects. While it may have seemed the researchers were downplaying their work, Elena realized the researchers were attempting to take a realistic approach to include people on both sides of the issue and address any shortcomings in the field early on.

Additionally, Jessica found that many of the researchers at ICoMST were doing work on local issues that directly affected the places they were from. A researcher from South Africa, where fresh water is not always in abundance and is not readily provided to livestock, studied what impact the lack of water has on livestock operations. Other researchers that attended ICoMST shared their novel topics. The group's friend from the United States, Sebastian Hernandez, presented on his dissertation research on characterizing the metabolomes of plant-based meat alternatives and ground beef. Additionally, a researcher from Ukraine, now based in London, is studying applications of cold plasma in the meat industry. In recent months, MSABD has also begun to examine possible applications of cold plasma and identify potential collaborators.

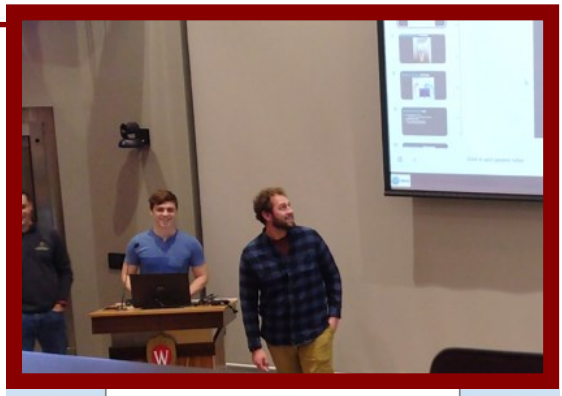
On the final night of ICOMST attendees and their guests could attend a gala. Both Elena and Jessica enjoyed seeing academics and professionals alike show a lighter side of themselves and dance the night away with ties tied around their heads like bandanas in the Italian summer heat.

Upon returning home, the group has enjoyed dreaming about their educational, Italian trip. They recommend other students, staff, and faculty take advantage of opportunities, like this, to learn about the meat and food industries in other cultures.

Submit Feedback Here

Engineering Students Study Ultra-Chill

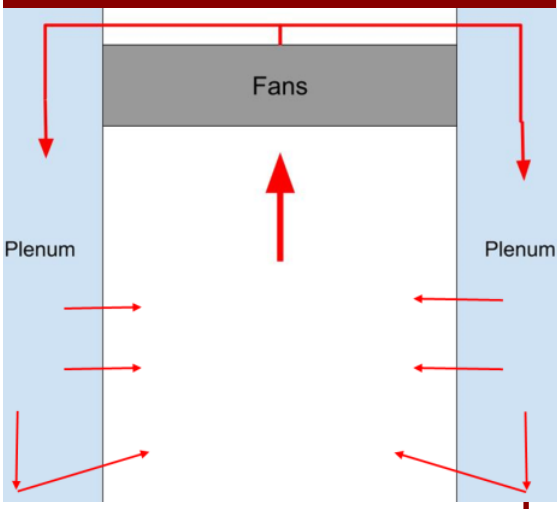
With edits by Jordan Nehls, Dr. Doug Reindl, and the College of Engineering Students



A group of four undergraduate students from the College of Engineering at UW-Madison recently presented their preliminary findings based on the first of a two-semester senior design project studying the Ultra Chill system at MSABD. The project aimed to address the chronic underperformance of the Ultra Chill system. The use of MSABD as a project case study was facilitated by Dr. Douglas Reindl, a Professor of Mechanical Engineering with a research interest in industrial refrigeration systems and technology. Dr. Reindl has collaborated with MSABD and meat science at UW-Madison for years on various food industry research projects.

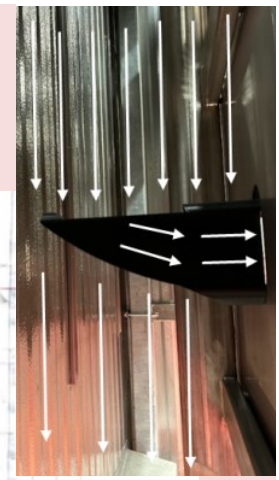
The student's project began with analyzing past carcass chilling data collected on the Ultra Chill's performance provided by MSABD Food Safety, Quality, and Regulatory Manager Jordan Nehls, who served as the MSABD contact for the project. While the Ultra Chill was built to emulate an air blast freezer and was expected to cool the ham of a pork carcass from 105°F to 70°F in 90 minutes, the data showed that in reality the ham temperature was barely under 100°F after 90 minutes. After a site visit at MSABD and collecting data, the students determined a major culprit was severely anemic air flow in the Ultra Chill chamber. Whereas the students would have expected to find air velocities in the range of 10-15 feet per second (ft/s), they instead measured velocities at or below 6 ft/s.

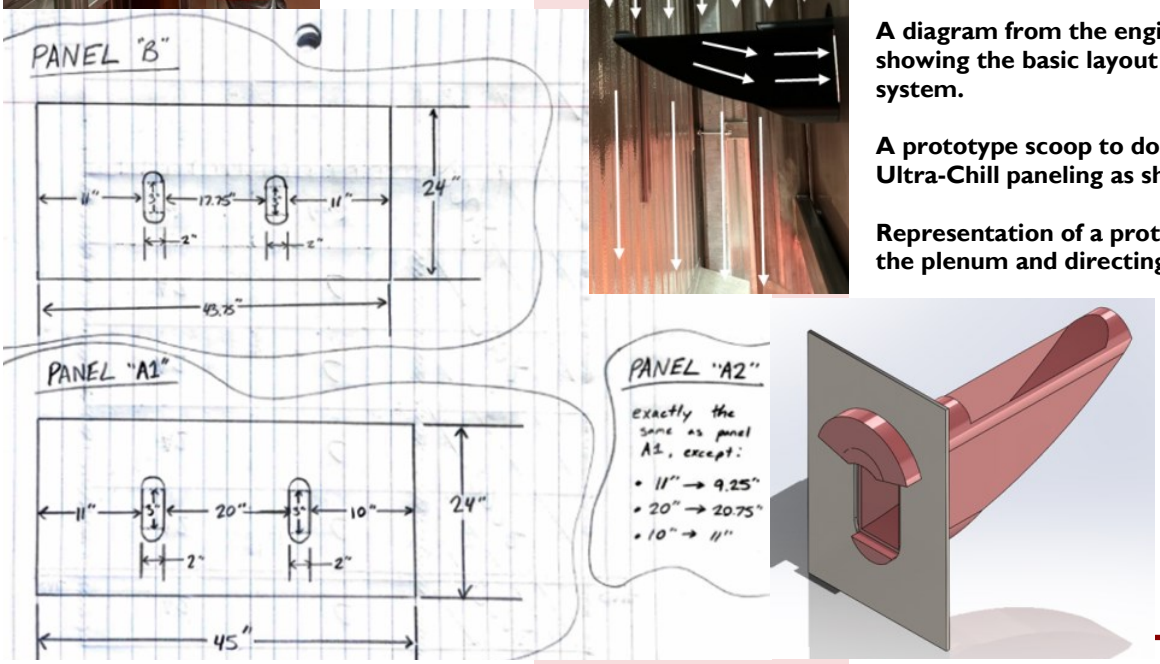
After determining chilled air was not being directed towards the carcasses in the Ultra Chill chamber but instead flowed vertically through the plenum and was recirculated back into the fans, the students used a 3-D printer to test several potential supply diffuser modifications. The elegantly simple prototype scoop and nozzle apparatuses dock into the existing holes within the panels and ductwork of the Ultrachill and improve airflow using a scoop that catches air from the plenum and directing it to where the carcass hangs on the rail via a nozzle. One prototype was designed to accelerate the air to supersonic speeds but ultimately did not work as intended, and other nozzle designs ended up being more effective.



All told, the students were able to use the Engineering Equation Solver (EES) software to model chilling of a 12" sphere, which was simulating a pork carcass, from 100 °F to 84°F after 90 minutes. Even though the model indicates the original Ultra Chill design of chilling the ham of a pork carcass from 100 °F to 70°F in 90 minutes may not be feasible, the students believe they can achieve additional airflow and cooling to improve performance.

(cont'd)





Starting Top Right, Clockwise: The engineering students present their findings at MSABD.

A diagram from the engineering student's presentation showing the basic layout and workings of the Ultra-Chill system.

A prototype scoop to dock into existing holes in the Ultra-Chill paneling as shown in a computer rendering.

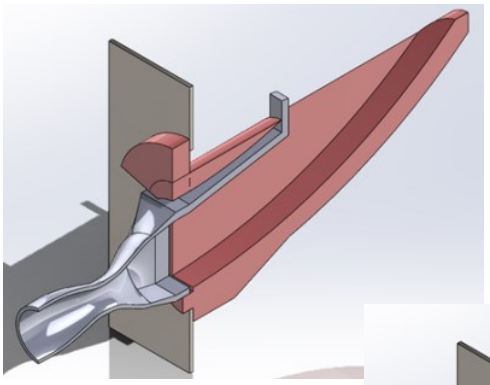
Representation of a prototype scoop collecting air from the plenum and directing it into the Ultra-Chill chamber.

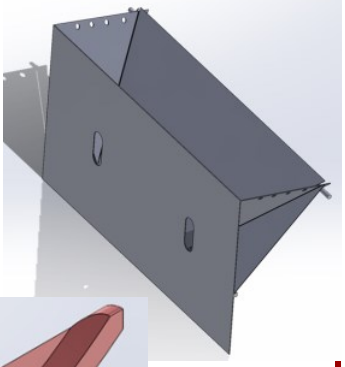
Sketches from one of the engineering student's notebook as they took measurements of the Ultra-Chill system.

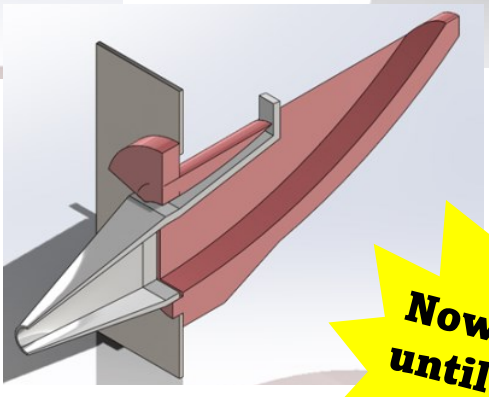
One of the engineering students measures airflow from a hole fitted with a prototype scoop.

In the coming semester, the students plan to model the Ultra Chill using Computational Fluid Dynamics (CFD) to fully understand the system and the changes or prototypes needed to achieve improvements in the Ultra Chill's performance. Thermodynamics and heat transfer in particular are complicated fields, and like all research projects, more research is needed, but the students clearly showed relatively simple and cost-effective (and easy to clean for food safety!) modifications can help develop an understanding and directionally indicate changes that can improve the performance of the Ultra Chill system.

With complex and advanced systems, MSABD offers many potential case studies that mimic real-world issues for students in the College of Engineering. The students on the Ultra Chill project commented that they appreciated the opportunity to apply engineering concepts to find solutions for a client in a unique situation. MSABD has previously hosted engineering students studying different pieces of meat processing equipment and will continue to foster and expand reciprocal research opportunities for students in other departments and colleges across UW-Madison.







From L to R: One of the engineering students models a 3-D printed prototype air scoop, a rendering of a prototype air scoop with converging/diverging nozzle attachment, a rendering of a prototype air scoop with converging nozzle attachment, and a rendering of a larger prototype bucket-style air scoop for inside the plenum.

In The News

Dr. Aaron Bodie was recently named to Stop Foodborne Illness's "40 Under 40" list of "rising stars who are revolutionizing the field of food safety." Aaron, who studied at MSABD under Dr. Steven Ricke, graduated from UW-Madison in summer 2022. The annual "40 Under 40" list emphasizes individuals' growth potential, "their contributions to food safety culture, and their ability to inspire others" in their work in academia, industry, or the regulatory system. Stop Foodborne Illness grew out of the *E.. coli* outbreak that struck the west coast of the United States in 1993 and has successfully advocated for food safety legislation. [To view the full "40 Under 40" list, please visit: Forty Food Safety Professionals Under Forty].

Whether he is helping processors meet Global Food Safety Initiative standards and/or regulatory standards as a consultant, communicating with researchers, or writing for Frontline Data Solutions' food safety blog, Aaron advances the field of food safety while bridging many working groups. His social media videos, released under the pseudonym Dr. Micro Food Safety, are a fresh and creative take on increasing awareness about foodborne pathogens. In one video, Aaron explains how, with improper handling, pathogens can be harbored in the pre-cut fruit and vegetables sold in many grocery stores. He then recommends purchasing whole fruit and vegetables to cut at home instead. [To explore Aaron's social media presence, please visit: dr.microfoodsafety].

Congratulations Aaron!

Now OPEN until 6 PM!

HOURS

Monday :	11 am – 6 pm
Tuesday :	11 am – 6 pm
Wednesday :	11 am – 6 pm
Thursday :	11 am – 6 pm
Friday :	11 am – 6 pm
Saturday :	CLOSED
Sunday :	CLOSED

BUCKY'S Varsity MEATS

Max Sell - Retail Operations Manager
University of Wisconsin-Madison
1933 Observatory DR
Madison, WI 53706
(608) 262-7801
amsell2@wisc.edu

Bucky's Varsity Meats now has three free dedicated parking spots for customers across Observatory Dr along Willow Dr. Look for the signs!

When Stephanie Hoff of the Midwest Farm Report visited MSABD this past December, she talked with Plant Operations Manager Dillon Walker about the growth of MSABD's retail outlet, Bucky's Varsity Meats. The Midwest Farm Report is broadcast on FM and AM radio across nearly all of Wisconsin and carries a variety of agricultural themed content. The interview started with a recap of the store's successful model, popular with loyal customers, in which animals come mostly from research and teaching projects and products are made by undergraduate students gaining valuable experience. Building off that, Bucky's Varsity Meats has recently expanded into the UW-Madison Eagle Heights apartment complex. Dillon explained that a lot of other University students are discovering the store and are pleasantly surprised by what they find. MSABD has long suspected that the opening of the nearby Bakke Recreation & Wellbeing Center would increase foot traffic in the area and into the store. On top of that, many people have experienced the new Bucky's Varsity Meats concession stand, which sells hamburgers and brats on game day at Camp Randall Stadium. According to Dillon, Bucky's Varsity Meats is now working with grocery stores in the Madison area to carry Bucky's Varsity Meats products. As word of the store spreads on campus and in the greater Madison community, Bucky's Varsity Meats will continue to help educate about where our food comes from and provide wholesome, safe to eat, meat products. This story was posted to the News section of the MSABD website, where it was picked up and carried in the eCALS Newsletter, a weekly news email from the College of Agriculture and Life Sciences at UW-Madison. **To review the eCALS feature, please visit: Bucky's Varsity Meats expanding to offer products in Camp Randall, grocery stores and more**. **To listen to Dillon's interview on the Midwest Farm Report, please visit: Varsity Meats Grows Brand, Student Interest**.

As of May 7, 2024, MSABD has been viewed over 80,000 times on Google Maps!

Kathleen Glass was recently quoted in a National Geographic article about the practice of washing meat. Dr. Glass is Associate Director of the Food Research Institute (FRI) at UW-Madison. Both Dr. Glass and FRI are long-time collaborators with MSABD on various food safety related research projects.

Bucky's Varsity Meats and former MSABD Extension Outreach Specialist Jesse Brookstein were featured in an article about landjäger in the Winter 2023 Issue 55 of Edible Madison magazine. To explore the Edible Madison article featuring an interview with Jesse Brookstein, please visit: Edible Madison Issue 55.

As reported by the UW-Madison Office of Federal Relations, nine staffers based in Washington, D.C. working for Wisconsin Senators and Representatives serving in the US Congress visited UW-Madison last August. The staffers were on campus to see and experience in-person the ways federal funding benefits the important research UW-Madison does. With titles of Legislative Correspondent, Legislative Director, Legislative Assistant, Legislative Counsel, Senior Policy Advisor, and Field Representative, the staffers play a central role in and directly influence the work of some of Wisconsin's Congressmen and Congresswomen in Washington. Part of the staffers' visit to UW-Madison included a lunch at MSABD, where program director Dr. Steve Ricke provided remarks before the staffers enjoyed products from Bucky's Varsity Meats. As a result of their time at MSABD, the staffers and the elected officials they serve have a better understanding of the important research MSABD does in everything from meat quality to food safety to biologics discovery. The staffers also have a personal connection to MSABD and better understand how MSABD is training the next generation of meat science workers and leaders and shares knowledge gained at the University with the people of Wisconsin and beyond to benefit lives (the **Wisconsin Idea** in action) via Dr. Jeff Sindelar's Extension program.

The nine staffers pose with Bucky Badger in front of Bascom Hall during their visit to UW-Madison. Photo by Bryce Richter / UW-Madison

Last November, UW-Madison Chancellor Jennifer Mnookin spent a day touring the College of Agriculture and Life Sciences. Part of her visit included a lunch with pre-tenure faculty, which was also attended by MSABD's Dr. Vanessa Leone. To learn more about the Chancellor's visit to CALS, please visit: Photos: Chancellor Mnookin visits CALS.

Dr. Vanessa Leone (3rd from R) listens while Chancellor Jennifer Mnookin (2nd from L) speaks. Photo by Michael P. King / UW-Madison

Similarly, UW-Madison Provost Charles Lee Isbell, Jr. visited CALS last November as well. One stop included a meeting and presentations at MSABD. Provost Isbell was even spotted in Bucky's Varsity Meats, where he spoke with student employee Cosmic "Fox" Nekuda '24.

UW-Madison Provost Charles Lee Isbell, Jr. (L) learns about landjager made at Bucky's Varsity Meats. Photo by Michael P. King / UW-Madison

Pioneers of the Past/Donor Spotlight: Robert Kauffman

Dr. Robert Kauffman
University of Wisconsin - Madison

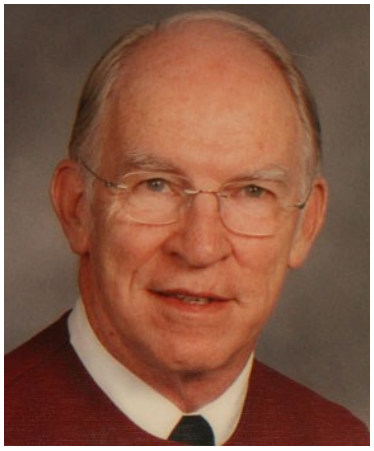
Written by Erica Kallas - Student Outreach Specialist

Dr. Robert "Scoop" Kauffman was born in St. Joseph, MO in 1932. Throughout his early life and helping at his family's farm, he developed a love for agriculture, eventually studying the topic at Iowa State University. He served in the ROTC, where he discovered his passion for teaching. After holding multiple teaching positions across the Midwest, in 1966, Dr. Kauffman became an Associate Professorship at UW-Madison.

Four years later, he became a full Professor. He was dedicated to his work, especially that regarding meat quality. At UW-Madison, Dr. Kauffman researched many techniques with the intent of improving meal quality. He integrated these techniques into academic courses and contests to teach the next generation of meat scientists.

Over his 30-year career at UW-Madison, some of the courses Dr. Kauffman taught include, Meat and Animal Science (MAS) 220, Meat Animal Growth and Composition; MAS 221, Meat-Animal Evaluation Team; MAS 205, Meat Science and Technology; and MAS 405, Livestock and Meat Marketing. Additionally, he co-taught AS 101, Introduction to Animal Science.

Dr. Kauffman wanted his students to think non-traditionally, to be inquisitive and lifelong learners. He earned the name "Scoop" with his dedication to teaching the full depth of topics, giving the full *scoop* through published manuscripts.



Dr. Kauffman valued connection above all. He organized and attended many events for students and faculty beyond just the classroom: MAS 220 student vs faculty basketball games; squash matches with his colleagues; meat-animal evaluation contests; Academic Quadrathlon quiz bowl, and more.

We hope to continue Dr. Kauffman's legacy of enriching the next generation of meat scientists through the Kauffman Experiential Learning Fund. This fund looks to raise $3 million by 2025 to allow MSABD to attract and support undergraduate students who are interested and skilled in meat production, meat science, food safety and supplies, anatomy and physiology, and animal biologics. This support will be accomplished through experiential learning opportunities including: coordinating internship field trips to processing plants, restaurants, retailers, biotech labs, and more; inviting experts; providing sensory panels; supporting conference travel; and more.

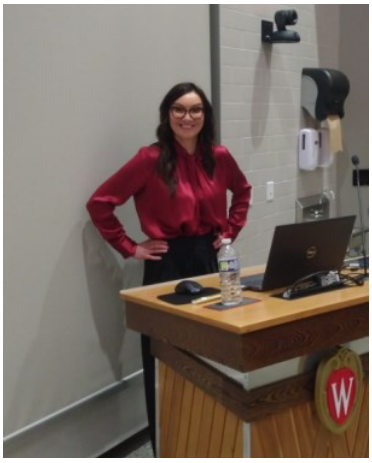
Donate here, to: "Kauffman Experiential Learning Fund", UW Foundation, U.S. Bank Lockbox, Box 78807, Milwaukee, WI-53278

MSABD Seminar Series: Dr. Robin Anderson

The MSABD Seminar Series continued March 21 when Dr. Robin Anderson presented "Food Safety on the Farm: The Search for Strategies to Reduce the Carriage and Dissemination of Foodborne Pathogens and Antimicrobial Resistance in Animals and Their Production Environment". Dr. Anderson is a Research Microbiologist/Lead Scientist with the USDA at the ARS Food & Feed Safety Research Unit in College Station, TX. His multidisciplinary research focuses on developing preharvest interventions to reduce the carriage of foodborne pathogens in swine and cattle. He earned his PhD in both Animal Nutrition and Microbiology in 1995 from Iowa State University.

PhD Defense: Elena Olson

On April 4, Elena Olson successfully defended her PhD. For her defense seminar, she presented "*Campylobacter* and Microbial Preference for Peptides and Amino Acids in Cecal Environment". Congratulations Elena!



The undergraduates listed to the right worked in the lab of a MSABD faculty member in 2023. These students came into their positions in a variety of ways. Many of the students are in ANSCI 299 - Independent Study and ANSCI 699 - Special Problems. In earning these undergraduate credits, students do introductory to advanced individual work under the direct guidance of an Animal Sciences (MSABD) faculty member. While still at Kansas State University in the first half of 2023, Dr. Gragg had an undergraduate student working in her lab as part of a program to place "high-achieving, serious-minded, first generation and/or historically underrepresented students [into] research projects in their field of study with faculty mentors." Undergraduate students who work in the labs of MSABD faculty as hourly employees still earn valuable hands-on experience in conducting research. Whether earning credit or not, students make connections between their work and their classwork, network, and learn transferable skills.

Working in the lab of a MSABD faculty member compliments other activities and opportunities undergraduate students take advantage of while at UW-Madison. Many of the students benefit from financial aid like the Cargill -Benevenga Undergraduate Research Fellowship and the CALS Undergraduate Research Scholarship. They often hold other related positions such as Specialized Animal Technician at the Center for Biomedical Swine Research & Innovation and Undergraduate TA in ANSCI/DYSCI 101/102, as well as in the Undergraduate Research Program at MSABD's close partner, the Food Research Institute (FRI). And quite often undergraduate students present the research they assisted with working in the lab of a MSABD faculty member. Sometimes this takes the form of co-authoring abstracts presented at conferences (e.g. the 2023 Poultry Science Association Annual Meeting). Often students create posters for symposiums, from the UW-Madison Undergraduate Research Symposium to the Introduction to Biology Poster Symposium. The following is but a sample of poster presentations from 2023.

"Impact of Housing Strategy on Health, Welfare, and Production of Laying Hens"
"Implications of Corn Pericarp Extract (CPE) as a natural antimicrobial preservative in the Meat industry"
"Validating Lignocellulosic Agricultural Residues from Seed Crops as a Feed Additive for Poultry"
"The Effects of Butyrate on Hepatic Stellate Cell Activation in Nonalcoholic Fatty Liver Disease"
"Impacts of High Dietary Fructose on Metabolic Status in Relation to Liver Injury"
"Interactions of Gut Microbes and Cholesterol in the Onset and Progression of Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis"

Finally, in some instances, undergraduate students that work in the lab of a faculty member at MSABD decide to continue their studies as a graduate student at MSABD. Such is the case with Ashley Tarcin, whose undergraduate research at MSABD and FRI was featured in MSABD Quarterly Volume 2, Issue 3 - Page 12.

Ashley Kim (Dr. Guo)
Caelen Nickle (Dr. Guo)
Dawson Stroik (Dr. Guo)
Ashley Tarcin (Dr. Ricke)
Maxim Peckenschneider (Dr. Ricke)
Christa Reich (Dr. Ricke)
Annie Noel (Dr. Leone)
Evan Silver (Dr. Leone)
Jordyn Figur (Dr. Leone)
Ashley Nelson (Dr. Leone)
Reagan Rodenbostel (Dr. Leone)
Sophie Spanos (Dr. Leone)
Molly Kalmer (Dr. Leone)
Lauren Sroda (Dr. Leone)
Yifan Jia (Dr. Leone)
McKenna Breunig (Dr. Leone)
Ella Blackburn (Dr. Leone)
Ezra Hayward (Dr. Richards)
Grace Huynh (Dr. Gragg (University of Kansas)

The "Summer" in Summer Sausage

Despite being traditionally enjoyed during the colder holiday season in Wisconsin, summer sausage's name evokes another, warmer, season. So what is behind the name summer sausage? Does is have to do with the season between June 21 and September 23, or is the "summer" portion perhaps an anglicization of the name of a village somewhere in Europe where summer sausage originated?

Summer sausage is thought to derive its name from the fact that the preservation methods that make it shelf-stable made it a staple during the hot summer months before the invent of widespread refrigeration. Summer sausage is traditionally made of beef or pork that has been fermented and cured, and it can be dried, smoked, and even cooked.

For Your FYI Information

2023 Master Meat Crafter Class Graduates

Between December 7 and 8 of 2023, the 2023 Master Meat Crafter class met in Madison for a final time to present their in-plant research projects and graduate from the program. The closing ceremony, held at the DoubleTree hotel downtown, culminated two years of hard work and awarded the graduates Master Meat Crafter status. Dr. Kent Weigel, Department of Animal & Dairy Sciences Chair; Dean Glenda Gillaspy, UW-Madison CALS Dean & Director; Karl Martin, UW-Madison Dean of Extension; and Randy Romanski, Secretary of Agriculture, WI DATCP were on hand to help celebrate.

The projects showed creativity and innovation in meat science and commercial meat processing. Broadly speaking, the projects covered topics ranging from value-added and local/ethnic products to variations in meat product processing/ingredients and process optimization. Other projects examined HACCP planning, packaging logistics, and even meat processing plant development and construction. Extending shelf life, improving efficiency in livestock handling, vegetable-based products, and cost/yield analysis were yet other topics covered by projects.

Below in alphabetical order by last name is the Master Meat Crafter Class of 2023.

Keith Mitchell
Mosida Market

Dustin Moldenhauer
Jones Dairy Farm

Ben Moline
JM Watkins

Nathan Broker
Fox Brothers Piggly Wiggly

Julie Camardo
Zweigle's Inc.

Lisa Caras
Jones Dairy Farm

Brandon Clare
JM Watkins

Luke Ciesla
North Country Smokehouse

Wade French
John's Meat Market

Megan Galiley
Benson Hill

Nelson Gaydos
American Assoc. of Meat Processors

Chris Greuel
Salchert Meats

Logan Heise
Custom Meats of Marathon

Tom Jordens
CT's Deli

Payson Kerns
Edgewood Locker

Stephanie Neu
PS Seasoning

Dan Sarapin
North Country Smokehouse

Jordan Schmit
Johnsonville Sausage

Quinn Schwellinger
Badger Ham

Igor Shwartsman
Alef Sausage

Evan Smith
This Old Farm

John Sorg
Sorg's Quality Meats and Sausages

Steven Tanck
Waseda Farms

Mark Youngs
The Butcher & The Baker

Congrats!

Eric Landwehr
Miesfeld's Meat Market

Morgan Larson
Handtmann Inc.

Marina Mikhaylov
Alef Sausage

Zach Miller
Miesfeld's Meat Market

David Nicholson
Johnsonville Sausage

Heather Oppor
WiMeat.com

Kip Padgelek
Excalibur Seasoning

Michael Rossi
Crexcent Meats

EXTENSION

Upcoming (2024):

8/13 - 8/15

Food Safety & Meat Microbiology School

9/17 - 9/19

WI Meat Processing School

10/22 - 10/24

Thermal Processing Short Course

Fermented & Dry-Cured Meat Products School

MSABD hosted the Fermented & Dry-Cured Meat Products School (a component of the Master Meat Crafter program) on September 12 – 14, 2023. The course looked at some basic meat science, technologies, and manufacturing equipment covering dry/semi-dry sausage and dry cured meat products. Starter cultures and biopreservatives for fermenting meat were examined, as well as the thermal processing and encapsulation typical of dried meats. Encapsulation refers to the process by which a meat's pH level is lowered to increase shelf stability (harmful pathogens find the meat too acidic to grow). Next, the class learned about the microbiology behind dried sausages and creating products that are safe to eat and satisfactorily meet regulations. Finally, some basic marketing techniques and how to communicate scientific information effectively were explored.

In all, the class followed dry/semi-dry sausage and dry cured meat products from conceptualization to RTE (ready-to-eat) product. And this was best captured in the students visiting the processing plant to help make their own products! The fermented and acidulated (lowered pH) snack sausages, pepperoni, Genoa salami, landjager, and Italian salami the class made represented dry and semi-dry sausage, while the dry cured bacon, dry cured ham, coppa/capicola, and lomo the class made represented dry cured meats. The course ended with the class making presentations about their work in the processing plant.

Speakers:

Jeff Sindelar
UW-Madison - MSABD

Andy Milkowski
UW Madison - MSABD

Brient Mayfield
Optimal Answers

David Burrington
Chr Hansen Inc.

Heather Hunt
UW Madison - MSABD

Ryan Goeser
Balchem

Ryan Cox
University of Minnesota

Jing Yi
UW-Madison

Jeremy Beach
UW-Madison

Preben Larsen
GEA Food Solution

Fritz Usinger
Usinger's Famous Sausage

with support from MSABD staff and students.

Advanced Meat Microbiology & Food Safety Short Course

The Advanced Meat Microbiology & Food Safety Short Course, held October 10-12 last year at MSABD, dived deep into the microbiology and logistics of ensuring the meat sold to customers is safe to eat. The course was very hands-on, with students breaking into small groups to complete exercises in 1) using a lethality spreadsheet while thermally processing (cooking) meat; 2) doing predictive modeling on the growth of the pathogens *Listeria* and *C. Perfringens*; 3) designing, interpreting, and validating a lab challenge (similar to a human or otherwise trial for a new drug in development to see how well it works); and 4) creating a plan for when something goes wrong and a product is NOT safe to eat instrumental in preventing recalls and keeping unsafe foods from ever reaching customers). The students then presented their experiences with the exercises and solidified their knowledge by teaching it to others in the course. Students also learned how to read food safety literature (published scientific papers) and about the genetic sequencing many leading scientists, including those at MSABD, use to track pathogens. Finally, the regulatory landscape and possible future of food safety was examined.

Speakers:

Chuck Kaspar
UW-Madison - FRI

Adam Borger
UW-Madison - FRI

Kathy Glass
UW-Madison - FRI

Kristin Schill
UW-Madison - FRI

Cindy Austin
UW-Madison - MSABD

Andy Milkowski
UW-Madison - MSABD

Jeff Sindelar
UW-Madison - MSABD

Dennis Seman
UW-Madison - MSABD

Bob Hanson
Hanson Tech

Wendy Bedale
UW-Madison - FRI

Peter Taormina
Etna Consulting Group

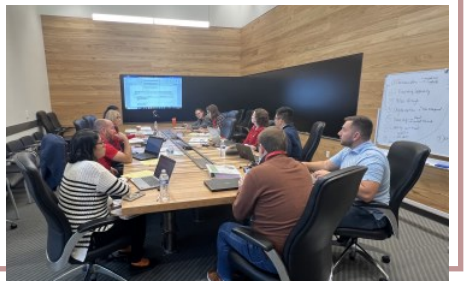
Sally Staben
Hormel Foods

Jan Innvaer
Mead & Hunt

Joe Meyer
Kerry Ingredients

Jeniffer Wages
Tyson Foods

with support from MSABD staff and students.



Animal Harvest & Product Utilization School

The Animal Harvest & Product Utilization School was held January 23 - 25 at MSABD. It marked the beginning of a two year journey for the new class of students in the Master Meat Crafter program. The class consists of 31 students representing 12 states, including Wisconsin, Alaska, and California. Before they graduate, the students will complete five other schools.

An overview of pork, beef, lamb, goat, and poultry harvests was provided to the Animal Harvest & Product Utilization School. These overviews were accompanied by actual pork, beef, lamb, and poultry harvests to demonstrate. Different methods for chilling and meat quality were also discussed.

Throughout the school, students learned about proper stunning methods and humane animal handling. They learned how to keep employees safe on the harvest floor and satisfy OSHA requirements. HACCP planning, antimicrobial interventions, microbial sampling, and other food safety topics were also covered.

Post-harvest, by-products were addressed in the context of not only rendering, but also animal biologics - bioactive molecules that can be used to improve animal and/or human health. MSABD's Dr. Vanessa Leone, whose research includes searching for new animal biologics to improve the functioning of the gut microbiome for numerous health benefits, delivered a 45-minute presentation titled "Animal Biologics in Animal Agriculture".

Speakers:

Jeff Sindelar
UW - Madison - MSABD

Jeff Swenson
WI Dept. of Ag, Trade, and Consumer Protection

Steve Ricke
UW - Madison - MSABD

Roger Johnson
BCJ Consulting

Dr. Catherine Pierce
USDA, FSIS

Dillon Walker
UW - Madison - MSABD

Blake Foraker
Washington State University

Dan Snyder
Washington State University

Jake Sailer
Sailer's Food Market & Meat Processing

Jordan Nehls
UW - Madison - MSABD

Chuck Bildstein
Bunzl Processor Division/ Koch Supplies

Roger Johnson
BCJ Consulting

Randy Romanski,
Wisconsin Secretary of Agriculture

Heather Hunt
UW - Madison - MSABD

Daniel Mallin
Arm & Hammer Animal and Food Production

Michael Lyons
USDA, FSIS

Jim Claus
UW - Madison - MSABD

Jessica Brown
UW - Madison - MSABD

Cindy Austin
UW - Madison - MSABD

Vanessa Leone
UW - Madison - MSABD

Jon Butt
Mead & Hunt

Larry Heacock
Sanimax

with support from MSABD staff and students.

2023 Publications:

1. Ager, E.O., T. Carvalho, E. Silva, **S.C. Ricke**, and J.L. Hite. 2023. Global trends in antimicrobial resistance on organic and conventional farms. Scientific Repts. 13:22608. doi.org/10.1038/s41598-023-47862-7.

2. Algarni, S., J. Han, D.D. Gudeta, B.K. Khajanchi, **S.C. Ricke**, Y.M. Kwon, D.D. Rhoads, and S.L. Foley. 2023. In silico analyses of diversity, and dissemination of antimicrobial resistance genes and mobile genetics elements, for plasmids of enteric pathogens. Front. Microbiol. 13:1095128. doi: 10.3389/fmicb.2022.1095128.

3. Algarni, S., S.L. Foley, H. Tang, S. Zhao, D.D. Gudeta, B.K. Khajanchi, **S.C. Ricke**, and J. Han. 2023. Development of an antimicrobial resistance plasmid transfer gene database for enteric bacteria. Front. Bioinformatics. 3: 1279359. doi: 10.3389/fbinf.2023.1279359.

4. Ayala, CV, Koulicoff, LA, Chun, CKY, Boyle E, O'Quinn, TG, **Richards, MP**, Jones, C and Chao, MD (2023) Exploring the effects of incorporating egg powder containing phospholipase $\alpha 2$ antibody to ground striploin on its shelf-life. Meat and Muscle Biology. 7, 16242, 1-11. http://doi:10.22175/mmb.16242.

5. **Baker S**, Desai A, Dinh T, **Richards MP**. (2023) Divergent Reactivity of Hemoglobin Isoforms αA $\beta 2$ and αD β from Meleagris gallopavo in Native and Fatty Acid-Modified 2 2 2 States. J Agric Food Chem. http://doi:10.1021/acs.jafc.3c05601

6. Bayne EF, Rossler KJ, **Gregorich ZR**, Aballo TJ, Roberts DS, Chapman EA, **Guo W**, Ralphe JC, Kamp TJ, Ge Y. Top-down Proteomics of Myosin Light Chain Isoforms Define Chamber-Specific Expression in the Human Heart. Journal of Molecular and Cellular Cardiology. 2023, 181: 89-97.

7. Bedale, WA, **Milkowski, AL**, Czuprynski, CJ and **Richards, MP**. (2023). Mechanistic development of cancers associated with processed meat and poultry products: A review. Meat Science. 7, 1-63. http://doi:10.22175/mmb.15762.

8. **Bodie, A.R**. C.A. O'Bryan, **E.G. Olson**, and **S.C. Ricke**. 2023. Natural antimicrobials for Listeria monocytogenes in ready-to-eat meats: Current challenges and future prospects. Microorganisms 11: 1301. doi.org/10.3390/ microorganisms11051301.

9. **Bodie, A.R.**, M.J. Rothrock, Jr., and **S.C. Ricke**. 2023. Comparison of optical density-based growth kinetics for pure culture Campylobacter jejuni, coli and lari grown in blood free Bolton broth. J. Environ. Sci. Health B. 58: 671–678. doi.org/10.1080/03601234.2023.2264742.

10. Chao, M, Colin K. Y. Chun; M. Roth; R. Welti; **MP Richards**; Wei-Wen Hsu. (2023). Exploring the potential effect of phospholipase A2 antibody to extend beef shelf-life in a beef liposome model system. Meat and Muscle Biology. https://doi.org/10.1016/j.meatsci.2022.109091

11. **Claus, J.**, & Jeong, J. Y. (2023). Limiting pink discoloration in cooked ground turkey in the absence or presence of sodium tripolyphosphate produced from presalted and stored raw ground breasts. Food Science of Animal Resources. 43(2):331-345. doi: 10.5851/kosfa.2023.e1

12. **Costello, M.***, P. Rubinelli, **J. Brown**, **E. Olson***, **D. Dittoe**, S.H. Park, D. Korver, Z. Lawless, D. Thompson, and **S. Ricke**. 2023. Comparison of yeast-derived commercial feed additives on Salmonella Enteritidis survival and microbiota populations in rooster cecal in vitro incubations. PLoS ONE 18(12): e0295657. doi. 10.1371/journal.pone.0295657.

13. **Dittoe, D.K.**, C.N. Johnson, J.A. Byrd, II, **S.C. Ricke**, A. Piva, E. Grilli, and C.L. Swaggerty. 2023. Impact of a blend of microencapsulated organic acids and botanicals on the microbiota of commercial broilers under clinical necrotic enteritidis. Animals 13: 1627. doi.org/10.3390/ani13101627.

14. **Dittoe, D.K.**, **E.G. Olson***, **L.A. Wythe***, Z.G. Lawless, D.R. Thompson, L.M. Perry, and **S.C. Ricke**. 2023. Mitigating the attachment of Salmonella Infantis on isolated poultry skin with cetylpyridinium chloride. PLoS ONE. 18(12): e0293549. doi. 10.1371/journal.pone.0293549.

15. **Dittoe, D.K.**, R.C. Anderson, N.A. Krueger, R.B. Harvey, T.L. Poole, T.C. Crippen, T.R. Callaway, and **S.C. Ricke**. 2023. Campylobacter jejuni response when inoculated in bovine in vitro fecal microbial consortia incubations in the presence of metabolic inhibitors. Pathogens 12, 1391. doi.org/10.3390/ pathogens12121391.

16. **Dittoe, D.K.**, R.C. Anderson, N.A. Krueger, R.B. Harvey, T.L. Poole, T.L. Crippen, T.R. Callaway, and **S.C. Ricke**. 2023. Survival of Campylobacter jejuni during in vitro culture with mixed bovine ruminal microorganisms in the presence of methanogen inhibitors. J. Environ. Sci. Health B. 58: 711-717. doi.org/10.1080/03601234.2023.2273754.

17. **Dittoe, D.K.**, R.C. Anderson, T.L. Poole, T.C. Crippen, R.B. Harvey, and **S.C. Ricke**. 2023. Chlortetracycline concentration impact on Salmonella Typhimurium sustainability in the presence of porcine gastrointestinal tract bacteria maintained in continuous culture. Pathogens. 12, 1454. doi.org/10.3390/ pathogens12121454.

18. Dogan, M., **A.L. Milkowski**, A.J. Steinberger, G. Suen, and **J.J. Sindelar**. 2023. The effect of commonly used organic acids on the microbiota of cured deli-style turkey breast. Meat and Muscle Biology 7(1): 1-12.

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25. Maher, J.M., J.S. Drouillard, A.N. Baker, V. de Aguiar Veloso, Q. Kang, J.J. Kastner, and **S.E. Gragg**. 2023. Impact of the probiotic organism Megasphaera elsdenii on Escherichia coli O157:H7 prevalence in finishing cattle. Journal of Food Protection. 86:100133. https://doi.org/10.1016/j.jfp.2023.100133

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36. Wei Ge, Qiurong Wang, Jun Tao, Stephen P. Ford, **Wei Guo**, Xiaoming Wang and Jun Ren. Maternal Nutrient Restriction Confers Myocardial Remodeling in Association with Dampened Autophagy and Mitophagy in Adult Sheep Offspring. International Journal of Drug Discovery and Pharmacology. 2023. Accepted.

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41. **Olson, E.G.**, T. Grenda, A. Ghosh, and **S.C. Ricke**. 2023. Chapter 27. Microbial pathogen contamination of animal feed. In: Present Knowledge in Food Safety: A Risk-Based Approach Through the Food Chain. L. Anelich, A. Boobis, M. Knowles, and B. Poepping (Eds.). International Life Sciences Institute, Academic Press, Elsevier. pp. 378-393. doi.org/10/1016/B978-0-0-12-819470-6.00023-8.

42. Patterson, J.A., T.R. Callaway, and **S.C. Ricke**. 2023. Chapter 1. The commensal gastrointestinal microbiota as a complex interactive consortia. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 3-20. doi.org/10.1007/978-3-031-40512-9_1.

43. Perumalla, A.V.S., **L.A. Wythe**, and **S.C. Ricke**. 2023. Chapter 7. Probiotics in poultry preharvest food safety: Historical developments and current prospects. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 127-166. doi.org/10.1007/978-3-031-40512-9_6.

2023 Publications (cont'd):

43. **Ricke, S.C.**, **L.A. Wythe**, and A. Scheaffer. 2023. Chapter 2. The poultry gastrointestinal tract: An overview of microbial ecology. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 21-34. doi.org/10.1007/978-3-031-40512-9_2.
44. **Ricke, S.C.**, **L.A. Wythe**, **E.G. Olson**, and A. Scheaffer. 2023. Chapter 6. Prospects for prebiotics and postbiotics in poultry. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 103-124. doi.org/10.1007/978-3-031-40512-9_6.
45. **Sindelar, J.J.**, 2024. Curing | alternative methods for cured meat products in the United States. In: Dikeman, M. (Ed.), Encyclopedia of Meat Sciences III, vol. 2. Elsevier, pp. 391–398.
46. **Wythe, L.A.**, **D.K. Dittoe**, and **S.C. Ricke**. 2023. Chapter 4. Advancements in poultry nutrition and genetics, The role of antibiotic growth promoters, and the introduction of feed additive alternatives. In Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition, T.R. Callaway and S.C. Ricke (Eds.), Springer Science, New York, NY. pp. 59-79. doi.org/10.1007/978-3-031-40512-9_4.
47. Callaway, T.R. and **S.C. Ricke** (Eds.), 2023. Direct Fed Microbials/Prebiotics for Animals: Science and Mechanisms of Action, 2nd Edition. Springer Science, New York, NY, 348 pp.

Most Recent MSA/MRAs:

- We R Food Safety
- Alkar-RapidPak, Inc.
- BioMerieux
- Chemital S.A.U.
- Linde
- Smithfield Foods, Inc.
- AgriGro
- Viskoteepak, LLC.
- Harvest Fuels, Inc.
- Fluxergy, Inc.
- PSSI
- General Mills
- Bar-S Foods
- Qualitech, Inc.

Total Grants Started in 2023: 16

Total Grants Starting in 2024: 7

Selected Grants & Contracts:

Dr. Jim Claus	
MPSC, Inc.	Vascular rinsing carcasses that includes calcium on goat meat tenderness
Dr. Wei Guo	
NIH	Posttranscriptional Regulation of RNA Binding Proteins in Heart Failure
Dr. Jeff Sindelar	
USDA, NIFA	Organic Alternatives to Conventional Celery Powder as a Meat Curing Agent
USDA, NIFA	Dairy Beef Crossbred Feeding Management: Applied Research and Extension Project
Foundation for Meat & Poultry Research Education	Creating Alternative Support for Lethality and Stabilization for Heat Treated and Fully Cooked Meat and Poultry Products

Selected New Grants & Contracts (cont'd):

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Dr. Richards, in collaboration with Dr. Sarah Adcock of the Department of Animal & Dairy Sciences, are exploring the logistics of raising black soldier flies as a protein source for feed for poultry farms.

Dr. Mark Richards	
NCR-SARE	Advancing sustainable agriculture through insect farming
Dr. Sara Gragg	
Foundation for Meat & Poultry Research Education	Understanding the impact of the farm and lairage environments on Salmonella contamination in market hogs
Foundation for Meat & Poultry Research Education	Developing a Quantitative Salmonella Baseline from Ground Beef in the United States
Dr. Steven Ricke	
NSF	NSF Engines: Type-1: An NSF Engine prototype for sustainable agricultural development through a statewide network of innovation hubs
USDA, NIFA	Harnessing iron metabolism to limit *Salmonella* In pre- and post-harvest poultry
Harvest Fuels	ProBiotein Postbiotic Impact on *Salmonella* Establishment in Broilers
Dr. Vanessa Leone	
DHHS, PHS, NIH	The role of dietary cholesterol in Nonalcoholic fatty liver disease through the action of gut microbiota

Dr. Gragg's grants help fund her food safety research, which includes longitudinal studies that examine the spread of pathogens throughout the whole process from live animal to ready-to-eat product.

Meat Science & Animal Biologics Discovery Quarterly is currently sent to 5,163 subscribers.

MSABD Tour Groups (SEP 23 - APR 24):

Wisconsin Senator Brad Pfaff
Zoetis Inc.
American Society of Agricultural and Biologic Engineers
UW-River Falls Meat Pilot Plant
Envision Greater Fond du Lac, Inc.
Madison Region Economic Partnership (MadREP)
North American Meat Institute
Delegation from Zambia
University of Nevada, Reno

In the next edition of Meat Science & Animal Biologics Discovery Quarterly, we will look into the many exciting developments in the Guo Lab, visit with Matt Finch on taking over the Assistant Retail Manager position at Bucky's Varsity Meats, and talk to Jordan Sand about his start-up business that uses technology developed at MSABD.

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Unless otherwise noted, articles written by MSABD Administrative Assistant Dan Mechenich.