2018
Food Systems Fellowship Program

MICHIGAN STATE UNIVERSITY
College of Veterinary Medicine
MSU CVM
Food Systems Fellowship Program

In 2006, the Michigan State University College of Veterinary Medicine established the Summer Food Systems Fellowship Program to provide value added experiences for veterinary students focused on serving the food animal industry. The goal of this program is to provide a training experience that broadens the students’ exposure and understanding of the food industry. This is facilitated by partnering with the animal agriculture industry in providing a unique and valuable summer experience that adds value to the student’s education.

2018 marked the 13th year for the Summer Food Systems Fellowship Program. 135 individual food animal interested students and 24 different partners have participated in the program since 2006. Partnerships have been forged locally, nationally (Kansas, Iowa, Washington DC, Indiana), and internationally (Chennai, India). In 2018, we had ten students working in positions ranging from pharmaceutical companies to government agencies to milk cooperatives. The willingness to participate in an innovative program underscores our partner’s commitment to the future of food animal agriculture and the need to train well qualified veterinarians to work in the food industry. Most importantly, their mentorship of students has provided invaluable experiences that have broadened the skills of veterinary students. We believe these skills will make these future professionals better prepared to meet the needs of the food animal agriculture industry not only in Michigan, but nationally and internationally. Our partners deserve most of the credit for making this program the success that it has become.
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The Front Cover picture is courtesy of Dr. Dan Buskirk, Michigan State University Department of Animal Science. The picture is of yearling bulls at the MSU Beef Center.
This summer, I had the honor of working with Michigan Milk Producers Association (MMPA) as their Food Systems Fellowship Intern. MMPA is a farmer-owned dairy cooperative that provides member farms with a market to sell their milk, services to improve milk quality and animal welfare, and various other opportunities for members to have a say in what happens to the milk they produce. MMPA also has processing plants that produce butter and dairy ingredients, national award-winning cheeses, and supply fluid milk to bottling plants and other dairy processors.

As the veterinary student intern, I was provided a lot of different opportunities to be involved in the field working with member representatives and farmers. Most days, I would visit farms with their representative to complete routine farm inspections, do milk quality troubleshooting, or complete the Farmers Assuring Responsible Management (FARM) program. During routine inspections, we’d check milking equipment for hygiene and deterioration, proper chemical safety, cattle wellbeing, condition and cleanliness of the milk house and parlor, and evaluate many other aspects to make sure each farm was operating correctly. At the end of the inspection, the farm would be provided with a list of items that needed to be fixed with a deadline to get them done. When a farm received a high Somatic Cell Count (SCC), which is a signal of a high incidence of udder infection, an illegal raw bacteria count or a high pre-incubation (PI) count, we would determine the source of the high count and provide recommendations to fix it. For the FARM program, we would evaluate the farm’s herd health book and operating procedures, evaluate animals, check that proper protocols were being followed and confirm that the farm had an updated Veterinarian-Client-Patient-Relationship (VCPR).

I also had the opportunity to help with several herd tests. Herd tests are completed when a farm is having issues with somatic cell counts and mastitis, and they want to know what type of bacteria is causing the infection. By knowing the specific bacteria, veterinarians can treat animals with a targeted approach and the farm can understand where the pathogens are coming from, and therefore, how to prevent new infections.

Because of my personal interest in on-farm education, I got to be involved with several Milker Training Schools. For these sessions, a member representative teaches a class to farm employees on udder health, milking equipment, proper milking procedures, and the science behind why this procedure should be used. The current procedure is then evaluated, improvements are made, and employees are evaluated on the new milking protocol to ensure
everyone does the same procedure with proper timing to stimulate milk let down and minimize risk of mastitis. I also had the opportunity to teach children at The Great Dairy Adventure how to clean teats and attach a milking unit, while also educating them on the benefits of consuming dairy products.

Each year, MMPA provides the veterinary student intern an opportunity to use their knowledge to develop something that will benefit dairy farmers. This year, I developed a housing evaluation for farms struggling with mastitis. While I didn’t have much background in the impacts of environmental conditions on milk quality and dairy herd health, this gave me an opportunity to educate myself on management systems and how they influence animal health. I was fortunate enough to take some classes for the Quality Milk Specialist course Dr. Ron Erskine’s team is designing to enhance my knowledge on this subject. By the end of the summer, I had designed an evaluation form along with a reference guide with standard values and recommendations for MMPA member representatives and a guide to give producers explaining why certain housing characteristics are critical to their herd’s health and milk quality.

My experience with MMPA allowed me to attend the Michigan Dairy Industry Conference in Traverse City where we listened to updates on dairy market trends and regulatory medicine and processing, and tour the Leelanau Cheese Company. I also got to participate in the 4-H Milk Marketing Tour where I learned about the laboratory and marketing sides of the dairy co-op. The final part of my internship allowed me to work with Dr. Erskine’s team on his VaDia project, where I learned how to use the VaDia equipment, which will be beneficial as a veterinarian.

This summer with MMPA has truly been invaluable. I had prior dairy experience, but being able to visit hundreds of dairy farms in Michigan, Indiana, and Ohio opened my eyes to the different practices and challenges dairy farmers face in this region. Every dairy is different, and as a vet, I’m going to have to work with my clients to meet their needs with the resources they have – which is what I was fortunate enough to gain experience doing this summer. I had incredible networking opportunities, and I got to experience agriculture all over the state, where I also picked out several areas I would like to practice at in the future! I now have the confidence to walk onto any dairy farm, even one I have never visited, and understand their facilities, pipelines and management systems, which is a vital skill to have. That’s not something you can learn sitting in a classroom.

I’d like to thank everyone at Michigan Milk for providing me with this opportunity, especially Lyindsay Earl and all the reps who let me tag along, Dr. Erskine for providing unique experiences, everyone involved in the Food Systems Fellowship, and finally, all of the dairy farmers I worked with this summer!
The MSU College of Veterinary Medicine Food Systems Fellowship Program participated in the 21st Annual Great Dairy Adventure—a free annual event at the MSU Pavilion that gives attendees an inside look at Michigan’s dairy industry. Attendees at the Great Dairy Adventure were able to see and pet real cows, practice milking on simulation models, learn how milk goes from farm to table in 48 hours, enjoy free dairy treats, and more. The Great Dairy Adventure is part of the Michigan Dairy Expo, Michigan’s largest annual dairy event. The Expo encourages youth participation in dairy activities, showcases the Michigan dairy industry, and provides continuing education opportunities.
My experience at NorthStar was way beyond what I expected. I had an absolute blast working with Todd and Bridgette and all the NorthStar employees. The work environment is incredibly friendly, and they all treated me as a colleague rather than a summer intern.

My internship was a little different than the typical NorthStar internship. During my previous summer, Dr. Ron Erskine trained me on these little devices called VaDias. VaDias record vacuum pressure during milking, giving us the opportunity to see exactly how well cows milk. Using VaDia data, and calculating a couple other factors, we can evaluate the milking routine and alter it to be more efficient. My favorite saying is that the VaDias “let the cow do the grading.” When a proper milking protocol is in place, the cow’s oxytocin has enough time to reach the udder to let down the milk before the milking unit is attached. When there is not a proper milking protocol, VaDias can show us when cows have a bimodal milking. The term bimodal indicates that when the unit was attached, milk started flowing as her cistern emptied, but then stopped because oxytocin had not yet caused the udder to let-down milk. Once oxytocin reaches the udder, milk will start flowing again. VaDias help visualize milking efficiency in a way that can enable managing this outcome.

NorthStar wanted to investigate use of VaDias as a service they might offer through their cooperative. Since I was already trained, I decided to apply for the position and was overjoyed when they offered it to me. I already knew what a difference these units could make, and I looked forward to the opportunity to help more people understand the potential value the units can offer.

NorthStar was not exactly sure how the VaDias might fit into their company. However, DHI specialists were already in the parlor and that seemed to present an opportunity to gather data with the VaDias. This information could then be sent to the farms’ veterinarians for analysis. To put their idea into action, I collaborated with four vet clinics in Michigan which had expressed an interest in VaDias analysis. After meeting with the clinics, they each selected three farms to participate in the trial. Coordinating my farm visits during milk test days allowed me to work with DHI specialists and train them on use of the units. After gathering and analyzing information from each herd, I met with herd veterinarians to help them interpret the results.

This summer's work reinforced how use of VaDia information encourages veterinarian’s involvement in dairy parlors, and allows them to build more employee relationships and help improve the farm’s efficiency. A recent study showed that most employees desire to learn more about their job in the milking parlor. This gives veterinarians an opportunity to be science educators and explain not only why a proper milking protocol is needed, but how it works.

At the end of my internship, NorthStar hosted a meeting which included industry professionals, veterinarians, and producers. The goal was to share results from the summer, and gain more
opinions about offering VaDia analysis as a service. Dr. Erskine presented information about how VaDias work, and we were able to offer continuing education credits for veterinarians that attended. My presentation lasted about 45 minutes and I was able to share the results from the 11 farms I visited this summer. We ended up having a turnout of 45 people!

NorthStar hasn’t decided if or how they will incorporate VaDia analysis into their services, but they gave me an incredible experience. I was able to network with 17 vets around Michigan, 11 farms, and many NorthStar employees. This summer, I also gained experience communicating with producers and veterinarians, and developed a new perspective on the dairy industry!

**Veterinarians Food and You**

In 2018, the MSU College of Veterinary Medicine Launched the news channel *Veterinarians Food and You*. This on-line web news channel features stories highlighting the roles of veterinarians in the production of safe, high quality, wholesome and plentiful food. All of the participants in the 2018 FSF Program contributed to this endeavor. To read their contributions, go to: [https://cvm.msu.edu/vetschool-tails](https://cvm.msu.edu/vetschool-tails) and click on *Veterinarians Food and You*. 
This summer I had the incredible opportunity to complete my Food System Fellowship internship with NorthStar Cooperative at their headquarters facility in East Lansing, MI. NorthStar Cooperative offers a variety of internships to undergraduates and veterinary students in many business units. My experience was under the direction of Dr. Casey Droscha in NorthStar’s Research and Development Business Unit, AntelBio. This summer I was able to learn about NorthStar’s diagnostic laboratory, help on field trials, and my own project.

NorthStar has a laboratory in Grand Ledge, Michigan designated to DHI and diagnostic testing. DHI testing is a service offered to dairy producers that evaluates the components (Fat and Protein) while also looking for somatic cells (SCC) which can be an indication the cow has mastitis (an udder infection) and needs treatment. On average NorthStar tests 450,000 milk samples annually through DHI. In addition to their commitment to helping producers through component analysis, NorthStar also plays a role in helping keep their cows healthy through diagnostic testing. NorthStar offers testing for diseases like Johne’s and Bovine Viral Diarrhea Virus. If producers did not routinely test, infected animals may be left unidentified and could infect many of their herd mates. This summer I was able to learn about what is involved with DHI testing from the technician on the farm collecting the samples, to the numerous workers who catalog, test, and organize the samples. Additionally, NorthStar offers an incredible service to producers where they will pull samples with high SCC results and test them for mastitis. This service allows producers to quickly and effectively identify and treat their sick cows.

This summer NorthStar is also running a Bovine Leukosis Virus (BLV) field trial to look at how producers can use BLV testing results to help eliminate the disease from their herd. Almost 50% of cattle in the United States are infected with BLV, making BLV a major problem for cattle producers. BLV is a disease that can cause lymphoma in cattle, however there are many costly implications for producers such as decreased longevity within the herd, increased carcass condemnation at slaughter, and decreased immune function. This summer we collected blood samples from known BLV positive cows, from 4 dairy herds in Michigan. These samples had DNA extracted and were tested for BLV, the results were then used to calculate a pro-viral load (PVL). The goal is that producers can use PVL to identify which cows are the sickest, which will hopefully allow them to eradicate BLV from their herd in a timely and cost-effective manner.
My project this summer involved designing and validating a diagnostic assay for bovine mastitis that will be marketed through NorthStar’s Commercial Diagnostic Laboratory in Grand Ledge, Michigan. I was able to use cutting edge molecular biological techniques to design and validate a sensitive and specific assay for the major mastitis causing pathogens. Our goal was to provide farmers with an affordable alternative to the currently available equivalent. Our hope is that by reducing the cost of mastitis testing producers will be able to take full advantage of the diagnostic options offered by NorthStar Cooperative to help make their cattle healthier and more productive. The knowledge that I have gained about the scientific process and molecular biological tools like PCR will be invaluable to me in the future.

Overall, my experiences this summer have set me up to be a more successful food animal veterinarian. I was provided with the opportunity to see a unique role for veterinarians in food animal medicine research. I was extremely impressed with the standards that NorthStar Cooperative holds all of their employees to. The quality of their research and commitment to the dairy industry are impeccable. I would like to thank Dr. Grooms for establishing the Food System Fellowship and all of the work that he puts into maintaining and developing this program. I would also like to thank the partners I worked with at NorthStar Cooperative: Dr. Casey Droscha, Dr. Kelly Sporer and Dr. Todd Byrem, for everything that they did to make my summer exciting, engaging, and educational!
This summer I had the wonderful opportunity to work with the Michigan Department of Agriculture and Rural Development (MDARD), Animal Industry Division. I specifically worked in the cervid program, under the supervision of Dr. Cheryl Collins. The summer started off with an introductory period in which I attended departmental meetings as well as program manager meetings. During these meetings I got to listen to updates around the office as well as information regarding plans of action pertinent to prevention and response in case of disease outbreaks. One of the earliest meetings I attended was a joint meeting with the Veterinary Diagnostic Laboratory in which topics such as which diseases/toxicities should be considered reportable were discussed. A particularly important meeting I attended involved a workgroup that at the time was editing the Animal Industry Act, it was a great experience to hear them go through concerns and edits to such an important act.

The bulk of my projects involved working with tuberculosis (TB) and chronic wasting disease (CWD) data. As we would receive results from veterinarians and laboratories, I would input the information into our database. Using the inventories provided by the producers, I was also tasked with ensuring that our database had the most up to date inventories of the herds. Working in the database was a summer-long project as results would flow in at a steady rate. My main project involved compiling the data for the various herds to produce individualized letters for the producers, notifying them if they had submitted the appropriate number and quality of samples for CWD as required by law. This project was followed up by compiling data for the veterinarians to let them know how their actual collection of the samples had panned out; results were also distributed in the form of letters.

Additional office work included contact with some of the producers to verify/receive information. Correspondence was either through email or over the phone and the producers I spoke with were very forthcoming and cordial. Another small project included verifying information provided by a broker which involved sorting through information provided to us by the Department of Natural Resources (DNR) in terms of records of sales and purchases amongst the cervid producers.

In terms of getting out in the field, I did a number of visits while accompanying state workers. One of my very first visits was to an auction for dairy cows. I had never been to an auction before and it was cool to witness the entire operation. We did a small tour of the back of the facility and I got to see up close the various tags on the cattle, including the radio frequency identification (RFID) tags that I had grown very comfortable inputting. One of my favorite visits was when I accompanied Dr. Collins as well as our state veterinarian Dr. Averill to a deer ranch followed by a deer breeding farm. As I have never hunted, I probably never would have even seen a ranch! We had a meeting with the producers followed by a tour of the facility. I got to see the chute system they had in effect as well as multiple blinds so as to make the handling process easier on
the deer. We saw multiple deer of different age groups and received little antlers as a souvenir. The property was extremely beautiful and full of wildlife. The visit to the breeding farm was an extra treat as you could see the deer much closer and there were some fawns as well.

I also accompanied members of the DNR on farm visits to discuss proper fencing for producer’s cattle so as to keep the wild deer away. During this visit I learned a lot about how the DNR operates and their role in the protection of our cattle industry in terms of minimizing the transfer of infectious diseases such as TB and CWD from deer to cattle. During this visit I met a member of MSU Extension and was later able to accompany him on my free time to a dairy farm to help pull CIDR’s (controlled internal drug release) from the cow’s that he was using to conduct an experiment on. One of my next visits involved accompanying a field veterinarian to conduct TB testing on dairy cattle. I had a great time in the corral and we ended up taking a walk to another part of the farm where the yearlings were kept. My last two trips were to country fairs. The first trip I accompanied a different field veterinarian to collect samples from a sick pig and the second trip I accompanied both Alex Russell (my MDARD summer partner-in-regulatory medicine) and a field veterinarian to conduct routine voluntary testing of chickens for avian influenza. The fair was practically in Traverse City and Alex and I ended up staying the night and getting to explore the city the next day!

The culmination of the summer involved attending a conference in Gaylord where all of the producers were invited and welcome to come. There were over one hundred people in attendance, including MDARD and DNR members, veterinarians, and of course the producers. Important topics in the cervid industry were discussed as well as information regarding future law changes, not yet in effect. Veterinarians discussed case studies and use of medications and members of DNR discussed various topics and questions that the producers had. It was a great time and quite fitting as one of the earlier meetings I had attended involved a smaller, yet still significant number of producers being heard over their opinions on certain regulations and future law changes. The conference completed a full circle as I got to witness some of the results of the first meeting and it was great being able to interact with the producers that I had grown to know on paper.

I would like to thank the Food Systems Fellowship program organizers, Dr. Grooms and Ms. Robitaille, for the opportunity as well as Dr. Collins and the entire MDARD staff for making me feel like part of the team this summer.
Merck Animal Health, in partnership with the Food Systems Fellowship Program coordinated by Michigan State University’s College of Veterinary Medicine, awarded three scholarships to students participating in the program. Each student, who has expressed interest in pursuing a career in food animal production, received a $5,000 scholarship.

The 2018 recipients (L to R):
Meggan Freeland, Kellie Rizzolo, Katie Kesler and Jackie Maeroff
I feel extremely fortunate for the Food Systems Fellowship giving me the opportunity to work with the Michigan Department of Agriculture and Rural Development (MDARD) this summer in their poultry program. This position gave me some incredible learning experiences in regulatory medicine in the food animal industry; a career option I had never really considered beforehand.

My main project at MDARD was conducting an avian influenza (AI) surveillance project at county fairs throughout Michigan. To get the project underway, I first had to make phone calls to the poultry superintendents at the fairs to inquire if they were willing to participate in our program. Participation is completely voluntary for every exhibitor, but our preference is to obtain samples from many different regions of Michigan to prove to the best of our ability that Michigan is AI free. In total, I traveled to 12 of the Michigan county fairs, which was a great opportunity for me to see more of Michigan. Some of my favorite memories are traveling to the Upper Peninsula for the first time and exploring Traverse City.

Along with an MDARD field veterinarian, I would attend participating fairs to perform the AI testing at the scheduled date and time. The testing process involved using a sterile polyester tipped applicator to swab the oral cavity, opening of the trachea, and the choanal cleft. The swab was then swirled in a viral broth tube and transported to MSU's Veterinary Diagnostic Laboratory for testing. Up to five swabs can be pooled in one tube, therefore we used one media tube per exhibitor and could test up to five of each exhibitor's birds.

Of the about 350 birds I tested at the fairs, all came back negative for avian influenza. This goes to show the good health of our Michigan poultry, as well as the care poultry owners are taking to ensure that good health.

Along with testing for avian influenza at the fairs, I also assisted the MDARD field veterinarians with their fair inspections. This involved checking the animals for proper identification tags, ensuring Coggins tests were up to date for equine, and assessing the overall health of the animals exhibited at the fair. Every so often, an animal is reported sick at the fair, which causes concern not only for the other animals, but for people visiting the fair as well. As a result, I took part in a few disease investigations at the fairs due to some feverish swine. If the swine’s body temperature is over 105 degrees, swine influenza is a concern and samples should be taken for testing. Preventing the spread of disease can be complicated in a situation such as this where many animals are within close quarters. In this case, we do our best to separate the sick animals until they can be properly treated.
In addition, I was able to ride along with many of the MDARD field veterinarians and help with their day-to-day duties. This included assisting with several aquaculture and animal shelter inspections. It was very interesting to learn what a veterinarian who works for the state government looks for when doing an inspection. They are still caring for animals, just in a different way. Instead of treating the animals themselves, these veterinarians are looking for things that may negatively affect the animals, such as housing that could potentially enable the spread of disease, storage of chemicals near food, lack of cleanliness, or improper waste management. These are all aspects of regulatory medicine that someone working in a private practice may not notice or be exposed to, but are still important to the animal’s health.

Some of my other duties while assisting the field veterinarians were helping with bovine tuberculosis testing and attending a dairy cow auction at a sale barn. The sale barn was a great opportunity for me to learn more about the traceability of cattle. In Michigan, all cattle are required to have an identification tag to move locations. This tag allows us to trace their movements in a computer program. In the case of a disease outbreak, such as bovine tuberculosis, we can see all of the locations the sick animal has been so any other animals that have come in contact with the sick animal can be tested for the disease. To further learn about the traceability of disease, I assisted with bovine tuberculosis testing in a cattle herd within a few mile radius of a positive herd.

Although I spent a lot of time doing field work, some of my time this summer was spent in the office and at meetings. I enjoyed sitting in on these meetings because they gave me an inside look at some of the pressing issues in the animal industries being dealt with at the state level. For example, there is an outbreak of virulent Newcastle disease in California which has been causing concern throughout the summer. Bovine tuberculosis and chronic wasting disease were typically topics of discussion at these meetings, which provided for some great learning opportunities as well. I even sat in on a discussion to amend a current law regarding the animal industries.

My summer at MDARD was rewarding in so many ways and I am grateful to have had this opportunity to learn more about regulatory medicine. I want to thank Dr. Dan Grooms for organizing the Food Systems Fellowships. I also want to thank my supervisors and mentors at MDARD, Dr. Nancy Barr and Dr. Steve Hussey, for the opportunity to work at MDARD and for their guidance and expertise. Thank you to the MDARD Animal Industry Division staff as well, for being so welcoming and kind throughout the summer.
This summer I had the privilege of interning through the Food Systems Fellowship in conjunction with both Pharmacosmos and Midwest Veal to immerse myself in the role of the veterinarian in the veal industry. I was placed in small town North Manchester, Indiana and worked closely with Dr. Marissa Hake, Midwest Veal’s first company veterinarian. I also worked closely with Dr. Chris Olsen, veterinarian for Pharmacosmos, who communicated remotely from Iowa. My main focus was to conduct iron trials on veal calves at three separate Midwest Veal barns and in my free time from trial work I was to learn the workings of both the veal industry and the role of the veterinarian.

I started the summer by working closely with the team at Midwest Veal. Every Tuesday the company has “Team Day” where every available employee at the company splits into groups of 4-5 people to pull blood from calves that moved from the baby barn to the finisher barn. It is important to pull blood at this time to monitor blood iron levels. If the iron level in any calves is too low to be considered anemic, those calves all receive iron injections. While the goal of the veal industry is to produce paler, softer meat by regulating the amount of iron, it is not desirable to have anemic calves because anemic calves do not grow well and are sickly. In order to prevent anemia and subsequent loss of profit at harvest, any calves with low iron are given iron injections to boost health.

While I continued to participate in team day all summer, I also helped Dr. Hake daily as she performed health checks at any of the 100 or so barns owned by Midwest Veal. I was able to help apply cast to a broken leg, help with an enucleation, apply many splints to knuckling calves, become proficient in solo blood-drawing by drawing blood on hundreds of calves, perform more than 20 solo necropsies, observe how Dr. Hake interacted with each individual farmer, and more. It was an invaluable experience to be able to observe a veterinarian in this niche field of veal veterinary medicine. I was able to learn about the pitfalls of being in a field so specialized, such as the fact that almost no drugs are marketed for veal calves, so almost all drugs used in veal are used off-label which can prove to be a problem with the new Veterinary Feed Directive.

As mentioned earlier, my main role for the summer was to run veal trials for Pharmacosmos. Around 500 calves were enrolled in 3 separate barns to monitor weight and blood levels. Weights and blood were collected upon entering the study, around 1-5 days of age, then again when leaving to move to the finisher barn, around 7 weeks of age. Iron injections were given using Pharmacosmos’s iron Uniferon 200 at day 1 of the trial to all calves then again after team day to only the calves with low iron. While I was only working for the summer, the trial followed all calves from day 1 to harvest, which is usually around 6 months but that surpassed my end date. At harvest, meat color of each carcass will be graded to determine if the doses of iron given were either too much or too little, i.e. the meat was too dark or too pale and anemic. The data from this study will give the veal industry a better idea of how much iron should be given to veal calves throughout their life to produce pale meat while promoting optimal calf health.
Even though the majority of my work was with veal calves, I did have the opportunity to join Dr. Sommers with Maple Leaf Farms while they conducted audits at a number of their duck barns. Maple Leaf Farms is also headquartered in Indiana and they own a large portion of the duck farms in the state. In order to comply with optimal welfare standards in the duck industry, Maple Leaf Farm employees routinely split into 5 or 6 groups of four and head out to duck barns to conduct audits. Every farm owned by Maple Leaf Farm was audited once a year. The purpose of me attending these duck barn audits was to gain an understanding of how to perform audits in order to perform audits on the veal barns for Midwest Veal.

A side project given to me by Midwest Veal was to travel to more than 60 of the veal barns owned by Midwest Veal and perform audits. Although I am not a professional, the veal industry is soon to adopt the practice of auditing, so Midwest Veal wanted me to audit all of their veal barns in order to get their barns ready for the real audits that are likely to begin occurring in the next 5 years. This was an invaluable experience as I was able to observe the management and welfare of calves in many different types of barn styles and ventilation systems. I saw everything from the natural ventilation of Amish farms to the tube ventilation of conventional veal farms. I travelled thousands of miles, travelling to Midwest Veal barns in Indiana, Ohio, and Michigan. I believe this side project gave me a true snapshot of the veal industry in the United States.

Overall, this was an amazing experience. I was able to work closely with a veal industry veterinarian, run my own trials, visit duck barns, and perform audits on almost all of Midwest Veal’s barns. Throughout my experience this summer, I can honestly say that I captured the life of the veal industry. While it may be a small, niche industry, there is a lot of hard work that goes into ensuring a safe veal supply. It was invaluable to see the role of the veterinarian outside of the traditional private practice setting and opened my eyes to the roles that a veterinarian could play in the future.
This summer I had the privilege of working on MSU’s Beef Cattle Teaching and Research Center as part of the Food Systems Fellowship Program. I could not have asked for a better learning experience to expand my horizons. My main goals for this summer were to learn the day-to-day life and concerns that beef farmers are faced with. I wanted to be able to relate to my future clients. I can say without a doubt that my time at the MSU BCRC helped me reach these goals. My understanding and appreciation for the cattle industry grew ten-fold due to this experience.

For most of the first few weeks at the BCRC, I was taught how to perform the daily chores. I learned how to operate the tractor and mixer wagon in order to mix feed rations. Then, I was taught how to run the Skid-steer loader in order to load feed. Next came the Calan Data Ranger in order to deliver feed to individual pens of cattle. Thankfully, I had minimal experience, from many years prior, with running farm equipment, but I was still amazed at how trusting this group of men were when it came to allowing a newbie to run their expensive equipment on the first day. Not only was this experience great for a well-rounded beef cattle experience, but it was a great learning experience for gaining confidence in my abilities to step out of my comfort zone.

As I grew used to helping with the feeding, I was introduced to other aspects of the daily chores. I was taught how to do herd health checks and what signs of illness to beware of. My confidence in identifying ailments among the herd of cattle grew the more I went out and checked on them. I had not had a lot of chances to handle cattle outside of a chute, through my minimal previous experience with them. One of my favorite things to do this summer was to work cattle in the field and separate them into groups. There is so much more skill involved in working herds of cattle than what you would expect without experiencing it yourself. I was constantly determined to do better and worked to be an asset in sorting rather than just getting in the way like I did when I started. I feel like I made some improvements, but I still have a long ways to go to be a pro.

The BCRC acquired management responsibilities for the Veterinary Medical Teaching Farm last July which added a new aspect to their daily chores. The Vet Farm housed 2 deer, 2 alpacas, and 10 horses. These animals were all fed and checked on a daily basis. I loved completing these tasks every day because it provided me with a variety of experiences and allowed me to work with and connect with different species. My main passion has always been horses, so getting a daily or weekly dose of horses was a great bonus. I even had the enjoyment of watching the alpacas be sheared, and later have their hoofs trimmed which was a unique learning experience.

My summer project for the Food System Fellowship involved being a part of the Breakfast on the Farm planning committee and undertaking various responsibilities. I have taken great interest in helping to plan the Breakfast on the Farm event that will be held at the BCRC for the first time ever. Since 2009, MSU Extensions has been hosting Breakfast on the Farm events on various cattle farms throughout Michigan. Some of these events have been held on family dairy cattle farms.
farms and others, like MSU’s, have been on beef cattle farms. This event is intended to educate families and the local community on the day-to-day operations of modern farms. The desire is that the myths and fears of the unknown can be overcome through proper education and awareness. Breakfast on the Farm has reached over 85,000 people in its nine years of existence. Forty-five percent of these people say that they have not been on a modern cattle farm in the last twenty years. I tried to bring a unique perspective to the committee by being newer to the cattle industry and a mother that is always looking for fun things to do with my toddler.

One of my first tasks was to help plan the educational signs that will be used for the self-guided tour. This was more of a challenge for me than I expected it to be. I learned a great deal about myself during this experience as a whole. I very quickly learned that even after a whole summer of working on the BCRC there was still so much about the management of a full beef cattle operation that I did not know, or understand. I had to spend a lot of time diving into research and getting my facts straight from reliable sources before I could portray them into words for the public to educate themselves from. Another one of my tasks was to pull together quotes from several local tent rental companies in order to present the committee with options to help make the best decision on rental equipment we needed for the big day. Although this task was not particularly hard, it was another learning experience on going out of my comfort zones and good practice for the upcoming sponsorship and donation phone calls. At one of our last committee meetings we were all tasked with volunteering to make phone calls to various companies to request sponsorship or donation support. I very quickly learned that this was far from my area of expertise and that was okay. I just had to admit that I was better suited to spending my time on other tasks where I could actually help.

This summer fellowship was full of so many life and career experiences. For the first time, I truly enjoyed working with every employee and my employer. Everyone was easy-going which made me comfortable enough to admit when I had made a mistake, or did not understand something. They truly cared about teaching me and helping me grow in my confidence. It did not matter what task we were faced with on a day-to-day basis, we were able to get the job done with smiles and jokes galore. I have pretty high expectations for my future employer and work environment, now.
This summer I was given the opportunity to work with Merck Animal Health. My first week was spent in Northern Indiana. I was able to visit a veterinary distribution center to learn about all of the different Merck products and how those products are ordered and distributed to clients. We also went to Shipshewana to take genomic samples from calves. These samples were then sent to a lab and evaluated to determine genetic merit and help the company determine which animals would be embryo donors, embryo recipients or be bred to beef animals. We also learned how to perform a sanitation audit using a luminometer. A luminometer measures the size of a microbial population by measuring the amount of light that is produced when an enzyme, called luciferase, reacts with ATP (which is found in all animal, plant and microbial cells). We were able to identify problem areas on the farm and help the farmers to revamp their sanitation programs. At the end of the week I went to a conference hosted by Vet and Poultry, which is another distributer. Vet and Poultry invited all of the companies, whose products they distribute, so I was able to learn about products from other companies and how they compare to Merck’s products.

Week two was mix of both pig and cattle work. I spent a day in Ohio with a swine veterinarian, two Merck technical service veterinarians and one of their sales reps. We talked about a new technology that Merck is developing and how that technology could be implemented on that farm. The next day I went into Indiana to work with a private practice veterinarian. While here I gave over 200 vaccinations to beef calves and assisted with castration and learned more about pork production in Indiana.

My next two weeks were spent in South Dakota. My first few days were spent visiting different farms that are all owned by one company. These farms ranged from a 5000 head dairy to a feedlot for the donor animals. At the end of the week Merck hosted a training for some of the herdsmen on the farms. Merck flew in a veterinarian from Cornell that is fluent in both English and Spanish and she taught the workers about low stress handling and how to properly work with down cows. On the weekend I was able to go to some must see South Dakota attractions and do some sightseeing. I went to the Corn Palace, Wall Drug, Badlands National Park and I even got to see the boys out at Mt. Rushmore. The second week I worked with the veterinarian that is responsible for all of the farms, owned by the company, in this area. I was able to get a lot of hands on experience at these farms. I palpated, did pregnancy checks, evaluated fresh cows, evaluated feed samples, drew blood from the tail and I was even able to do a few necropsies. We also did some genomic sampling on some of the cows, looking for the A2 milk gene. I was also in charge of doing a parlor audit at the farms. I looked at time from first touch to milker attachment, the presence of any apparatus marks, somatic cell counts and teat and udder cleanliness. This information was then
compiled into a power point and presented to the milkers. I also learned how to go about requesting and completing import permits for shipping cattle.

After coming back from South Dakota I went to South West Michigan to spend some time working with a Swine veterinarian. She was doing a walk-through of all of the barns to assess overall health and to evaluate the success of a treatment plan to prevent scours. She also euthanized a few piglets, did a necropsy and took some samples from each of the piglets. Later in the week I rode with one of Merck’s technical service veterinarians. We went to the Tyson pork processing plant in Logansport, IN. I was given a tour of the facility, which was very interesting because I have never been to a processing plant before. While there we also evaluated carcasses for evidence of pneumonia in pigs that came from a certain farm.

The next week I spent in Northern Michigan and Northern Indiana. In Northern Michigan I rode with a swine veterinarian. With him I learned how to draw blood from pigs, collect saliva samples and perform necropsies on swine. We also looked at overall herd health. The rest of the week was spent doing cattle inventory in the Shipshewana area. Doing inventory was a very large endeavor. There were four teams of four to five people that divided up all of the growers, there were more than 130 growers, and scanned the animals into an electronic system as well as physically counted the animals. All of the facilities were very different from one another, some had only a few animals in pen housing, while others had over two hundred animals in group housing. It was a fun challenge to work at all of the different facilities, trying to figure out the best way to count the animals without causing too much stress. On the first day, my group alone, counted over 1600 calves! While at these farms I was also in charge of collecting fecal samples, which were then sent to a lab and evaluated to determine the parasite load and presence of coccidia at the different growers.

I spent the next week in Greenville MI at some dairy farms. The first day we TB tested animals that were being sent to a farm in Missouri. Here I was able to perform physical exams on quite a few animals. I was able to sit in on a few employee meetings, which was interesting because it gave me an insight into how the veterinarian interacts with employees and management. We also spent a lot of time scanning and sorting animals into new pens. I was also able to go to a completely robotic dairy, which was really cool, as it is something that I have never seen before.

This internship was a really amazing experience! I learned so much about veterinary medicine and have been able to develop and improve my technical skills. I have also had the opportunity to travel to some really cool places and see some really cool things. I’m very thankful to all of the veterinarians and farmers that allowed me to work with them and for providing me with a summer full of amazing learning opportunities. I would also like to thank Merck Animal Health, Dr. Mike Bolton, Jeff Leininger and Matt Harris for finding and setting up all of these opportunities!
My Food Systems Fellowship was completed at Zoetis where I spent my summer at the Richland, MI farm site. This year, Zoetis welcomed 35 students into their Veterinary Medicine Research and Development (VMRD) intern program. Throughout my internship, I have had the pleasure of working with clinical veterinarians Dr. Colt Daugherty, Dr. Peter Barrett, and Dr. JoDell Walker, as well as the technicians that make up the Animal Research Support (ARS) division.

With every new experience comes a new learning curve. For me, that was tackling the difference between biocontainment and biosafety. As a result, I have become well-versed in protocols designed to prevent the spread of infectious agents. Personal protective equipment (PPE) is used judiciously at the farm and showering in and out of buildings is a mundane reality for technicians and veterinarians.

My hopes for this internship were to gain valuable clinical skills. My mentors helped me exceed all expectations. I performed physical exams and blood draws on several species including cats, dogs, horses, calves, dairy cows, chickens, goats, and pigs. My dairy cow clinical skills were developed under the direction of Dr. Jeremy Block, where I learned rectal palpation, ultrasound techniques, and epidural administration. In addition, I learned how to age horses by their dentition. I also spent one morning at the Kalamazoo site assisting technicians with routine dog dentals. Basic suturing is yet another clinical skill I had the opportunity to learn during my internship.

While my main goal was to learn new clinical skills, the technicians on the farm taught me invaluable animal behavior and handling techniques. Working alongside species-specific technical experts taught me how to be safe while keeping animal stress levels at a minimum. Animals with large herd instincts behave very differently from those species that can thrive as individuals and it takes many years to master how to move animals efficiently.

Just as with commercial farm operations, calf health is a huge challenge at Zoetis. The clinical veterinarians spend a large part of their time in the calf hutches where they assess calf health and implement treatment plans. Keeping the hutches decontaminated and sanitized is a practice that requires the utmost attention. A fair amount of my time was spent in the hutches with technicians where I learned how to transition calves from bottles to buckets, give intramuscular/intravenous injections, perform health checks, and sanitize equipment.

When I was not feeding calves in the afternoon, I was in the Herringbone milk parlor we have on the farm. I had never milked a cow before this internship. This experience taught me how to use advanced milking machines. Learning how to clean the udder and teats before milking is an
important skill to take with me into the future when I am asked to give recommendations regarding milking procedures at a farm. This opportunity gave me yet another chance to practice handling and moving cows.

There were a couple occasions this summer where I assisted with a study that was at an off-site location. Here, I helped the principal investigator with lab work. We prepared the collected samples according to a few different protocols so that they could be stored and shipped back to the main Zoetis site. This study required simple lab skills, such as pipetting, aliquoting samples, and running a centrifuge.

As with any research institution, necropsies are routinely performed here at Zoetis. There is an outstanding amount of knowledge to be gained from learning how to necropsy an animal. As the summer comes to an end, I feel that I am very proficient at determining normal from abnormal tissue. My familiarity with the anatomy of several species has grown tremendously as well.

Towards the end of July, Zoetis hosted site visitors from AAALAC International, which is a private, nonprofit organization that assesses the welfare and humane treatment of research animals. Zoetis voluntarily enrolls in the accreditation program and spends roughly three years preparing for each visit. I was lucky enough to have had the chance to observe site visitors as they toured the farm and examined facility procedures.

The VMRD intern program here at Zoetis is extraordinary. Interns are treated like colleagues and given impactful research projects. My project dealt directly with animal welfare, as the clinical veterinarians here work to promote and enforce best welfare practices. The culmination of the project resulted in a presentation to the Institutional Animal Care and Use Committee (IACUC) for endorsement of a new welfare policy at Zoetis.

All in all, while interning at Zoetis, I have had the unique opportunity to learn about the complex process of how a newly developed drug gets to market. From disease model development to studies proving drug efficacy, I have seen just how important it is to utilize animals in a research setting. That said, I have experienced firsthand the utmost care and respect that animals receive in a research environment, which differs greatly from common misconceptions portrayed in the media about animal research. I am most thankful that I have had this opportunity for that reason, as I hope to utilize my positive experiences to promote meaningful dialogue with individuals who have a construed viewpoint regarding the humane treatment of research animals.
As part of the Food Systems Fellowship I was able to spend my summer working at Michigan State University’s Training Center for Dairy Professionals (TCDP). I had two major responsibilities while working at TCCDP, one was to establish a greater web presence for the center and the second was to work as a research assistant on a subclinical hypocalcaemia study. Both of these roles allowed me to work closely with MSU faculty and staff to reach a better understanding of the crucial role this center plays in our veterinary college.

While working at the Training Center I had a major role in promoting TCDP by working with members of the veterinary college’s office of marketing and communications to create a functional and appealing website for the Training Center. I also worked with the faculty at TCDP to create a Facebook page that would allow us to promote the center and advertise the opportunities available. These opportunities are created not only for MSU’s veterinary students, but also veterinarians and veterinary students across the world who are interested in seeking an internship or externship at our facility. To properly understand the functionality of the Training Center and how best to promote it, I was able to spend my days taking pictures and participating in the daily responsibilities being completed by the fourth year veterinary students and the Training Center faculty. This allowed me to take part in physical exams, case rounds, treatments, palpation, DA surgeries, and dystocias. The opportunity to have hands-on participation in these activities greatly increased my cattle handling skills and my over-all understanding of dairy medicine.

Another important aspect of my position was to assist in a subclinical hypocalcaemia study being conducted on the farm by MSU veterinary college’s faculty member, Dr. Mavangira. While working on this project I was required to conduct daily blood samples of cows in various stages of pre and post parturition. I also managed an excel file detailing my sample collection days and any notable comments or concerns. Working on this project also gave me the opportunity to work with the farm’s herdsman to better understand the rotation of cows through the farm so that I could schedule the best time to collect samples. Working on this study helped to further my appreciation for the intricacies of research, as well as the importance of communication and time management in both research and veterinary medical settings.

I found participation in this program to be incredibly rewarding. I not only contributed to a university research study, but I also learned an immense amount about dairy medicine and shared some of that information with the general public via our website and Facebook page. Both my research and clinical skills were tested and broadened as I worked daily on my assignments at TCDP. I witnessed first-hand the accomplishments being reached daily by our veterinary students as they fulfill their rotation at the farm, and I also fulfilled a number of these accomplishments myself. Working at this facility greatly increased my confidence and desire to work in food animal medicine, as well as gave me the tools and knowledge I need for success.
## FSF Alumni

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