Summer Food Systems Fellowship Program

To help meet the need of providing experiences for veterinary students focused on serving the food animal industry, the Michigan State University College of Veterinary Medicine established the Summer Food Systems Fellowship Program in 2006. By joining forces with food industry partners, the goal of this program is to provide a training experience that broadens the student’s vision of the food industry.

Students are selected for these positions based on criteria established by the program partners. It is the expectation that these fellowships are beneficial to the students, the industry partner and the overall veterinary training program at MSU.

2011 marked the 6th year for the Summer FSF program. Seventy-one food animal interested students and twenty-two different partners have participated in the program since 2006. Partnerships have been forged locally, nationally (Kansas, Iowa, Washington DC) and internationally (Chennai, India). The willingness to participate in a new and 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 food animal interested 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 is.

In this publication, you will find brief descriptions of the experiences of the student participants in the 2011 Summer Food Systems Fellowship Program, as well as highlights from the program this year. You can also find more information about the program at http://cvm.msu.edu/fsf or visit our FSF blog at http://msufsfs.wordpress.com/.
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This summer I received the opportunity to work with the 11th largest dairy cooperative in the United States which markets four billion pounds of milk annually. Michigan Milk Producers Associations (MMPA) mission is to market their members’ milk to the greatest advantage possible. Having 2,100 members that represent 1,400 farms, the responsibility of this mission covers members in Michigan, Ohio, Indiana, and Wisconsin. I have had the opportunity to visit and learn more about what occurs at their three main locations and in the field. The main office is located in Novi, MI which is also their lab site where samples that have been collected are ran and tested. The lab tests samples from every farm for any antibiotic residues, bacteria count, components, and a somatic cell count. Most of the milk is tested and then properly disposed of, however if there is a problem it may be stored for up to six months. The other two main locations are the Ovid and Constantine plants. At these locations butter, cream, condensed milk, non-fat dry milk powder, and specialty blends are produced and stored. During my visit to Ovid, I learned that samples are collected from each load and brought into the lab where a Charm test is ran for eight minutes to check for six different beta-lactam antibiotics. If the results are negative then the load is accepted; however if the results are positive the sample will be ran again, and in addition each farm will be ran to determine which farm caused the load to be rejected.

During the beginning of the summer, I worked with field representatives from northern Michigan to northern Indiana, and all the way between the western and eastern shores of Michigan. I spent time in the field identifying problems that were causing high PI counts (Preliminary incubation counts), high raw bacteria, and low freeze points. The PI count is a great indicator of the shelf life of the milk. A farm will receive premiums if the PI is 20 or below. The field representatives will be called out on anything above 100. Having a PI count over 100 tends to be dirty equipment issues but can also be due to poor udder prep or slow cooling. I am now able to identify several different locations that the problem could be arising from, including milk soils build up on paddles in the tank, overused and deteriorating inflations, milk vacuum lines with residual milk left in the line, milk build up in milk lines and / or the receiver, and dirty buckets. I also learned that when equipment has a rainbow blue appearance to it that it is an indicator of protein films left from the milk, which will also cause a PI count to spike. It was always interesting finding the cause of the problem for the producer. A raw bacteria count of 10 or less will bring premiums, at 50 the field representative visits the farm, and anything over 100 is illegal. The raw bacteria count is a good indicator that there might be a human health pathogen problem and is usually associated with a particular cow, group of cows, or poor cooling.
I was able to experience a cow related bacteria problem first hand when one of the field representatives had a load rejected due to high bacteria. I assisted in taking aseptic milk samples from each cow and then stained and identified high bacteria cows. Three cows were identified with elevated bacteria counts. Once the identified cow’s milk was stopped from being added to the tank the levels came back down to acceptable range.

Another area I worked with this summer was the Milking Systems Performance Assurance Program (MSPAP). Here I learned how to use a Triscan that develops graphs for a variety of tests. I learned how to graph pulsators, which demonstrated the different amounts of time during the 4 phases of milking: transition open, open, transition closing, and close. During the rest phase it is important that there is at least 200 milli-seconds for rest or at least 15% of the cycle to insure that blood and lymph moves back up into the teat. Without this time period, teat end damage will occur leading to hyperkeratosis. A pink ring will usually develop around the end of the teat which develops a nice place for bacteria to collect and grow. Using the Triscan, I have also been able to graph milk let down and vacuum on individual cows. Here I was able to check if the vacuum was set at the proper levels, the peak let down, low flow, and if she was not being stimulated for a proper amount of time. Another part of MSPAP that I was involved in was clean in place (CIP) checks. The complete wash cycle is monitored including time to fill the bulk tank and collected water from the tank to check the amounts of detergent, chlorine, alkalinity, and pH to insure that the tank has been washing properly. When running the detergent cycle, the temperature of the water should start out at 160 degrees to insure proper wash and end at no less than 120 degrees. I learned that checking the iron content of the water is also very important to determine the hardness of water. With any hardness over 15 ppm (which is considered hard water) adjustments to the amount of detergent used must be made. The harder the water the more detergent is needed. I have also checked the levels of vacuum that is running thru the system. The 4 usual places to check the vacuum are at the receiver, vacuum sensor or regulator, pulsation airline, and at the vacuum pump. This form of static testing is important to insure that the system is functioning properly; otherwise it can affect the performance and unit on time if the vacuum levels are fluctuating.

Another service that MMPA provides is preforming energy audits. I had the opportunity to work with a field supervisor to evaluate everything on the farm including ventilation, water heating, grain drying, refrigeration, milk cooling, vacuum pumps, and lighting. To determine the amount of lighting that is being produced I used a machine that measures light in foot-candles (fc). The American Society of Agricultural Engineers has three recommendations for dairy facilities which include having 100fc over the wash vats in the milk house, 20 fc for general lighting, and 50 fc beneath the cow’s udders during milking.

MMPA is very involved in all areas of mastitis management; two areas that I assisted with were herd tests and milker trainer schools. I have assisted with herd tests as small as 19 cows and as large as 1,200 cows. I believe that having a herd test done is a great way to identify the organism on that particular farm and have the ability to then work with the producers’ veterinarian to find the best treatment protocol. Michigan Milk provides milker training schools every year to their members to improve milk quality and udder health. At the milker training school, I assisted with set up and making adjustments to the PowerPoint presentation. The focus of the program was on prevention of disease and good udder prep procedure. The udder prep procedure explained insured that the teat sides and ends were cleaned by providing stimulation for
10-20 seconds, kill and fill time of the teat for 30 seconds, and proper attachment time of 40-90 seconds after start of stimulation. Having a good amount of stimulation and the proper amount of lag time before attaching the unit will insure maximum let down of milk and complete milk out. Additional items discussed in the training involved how the milking unit should be adjusted for each cow, complete post dip coverage and all personnel wearing gloves. I learned that in the situation of squawks being present, that air will enter that inflation pushing milk back up into the opposite teat which increases the odds of infection and the affects can be further increased by poor udder prep. Another important topic presented is over milking. When over milking occurs the teat ends become more damaged leaving an area for bacteria and future infections to develop. This should be monitored by watching for low flow of milk to identify when milkers should be removed or if the automatic take-offs need to be adjusted.

My internship with Michigan Milk provided the opportunity to become a certified evaluator in the National Dairy FARM (Farmers Assuring Responsible Management) program and I was able to complete twenty FARM evaluations. This program was developed by veterinarians, producers, and animal care experts having the goal of a verifiable dairy animal care program that is consistent with guidelines provided by the National Dairy Animal Well-being Initiative. This nation-wide program began in September 2010 and currently the FARM program has been implemented by farmers, cooperatives, and proprietary processors that provide 45% of the nation’s milk supply that is being produced. My responsibility was to work with the field representative in asking the producers a series of animal care related questions, and then evaluating a selected sample of the herd which involved a couple calculations to determine the sample size. The cattle were evaluated in 4 different areas: Locomotion having a score of 1(normal posture/ gait)-5 (reluctant to move); Body Condition scoring 1(Gaunt)-5(Thick layer of fatty tissue around short ribs); Hock condition was scored 1(normal)-3(hair loss and swelling); and hygiene scored 1(clean) - 4 (manure splattered up into udder/belly area and onto top of the cow). The effort of this program is to provide consistency and uniformity to providing dairy cows with the highest level of care and reassurance to the consumers. After a producer volunteers to become a part of the program they are subject to third-party verification to maintain the integrity of the program. Each farm has the option of continuing in the program in which they must go thru the process every three years to be recertified.

The individuals at MMPA provided me with an excellent learning opportunity that has opened my eyes to many parts of the dairy industry that I may have never considered. Every member of the MMPA staff is extremely friendly and willing to go the distance to do anything possible for their members. I tremendously enjoyed meeting with MMPA’s dairy producers and in assisting the field representatives in any manner I could. I will always be extremely grateful to Michigan Milk Producers Association and the Michigan State University College of Veterinary Medicine Food System Fellowship Program that has provided me with this amazing opportunity to expand my knowledge and interest in the dairy industry.

**AG FACT**

According to the latest UN projections, the world population will rise from 6.8 billion in 2010 to 9.1 billion in 2050. To feed this many people, food production will need to increase by 70%.

*Food and Agriculture Organization (FAO)*
The MSU Food Systems Fellowship program gave me the unique and extraordinary opportunity to work on Capitol Hill this summer. I worked as a legislative fellow for the Senate Committee on Agriculture, Nutrition, and Forestry, chaired by our Michigan Senator – Debbie Stabenow. The Senate Agriculture Committee provides legislative oversight for everything through the US Department of Agriculture – which is a lot! The programs are reauthorized approximately every 5 years through the Farm Bill. The main focus of our work this summer has been preparing to write the 2012 Farm Bill.

Working on the hill is a challenging experience for anyone, regardless of your education or background. It’s so fast-paced that you are forced to learn quickly about a broad range of issues and assess the big picture impacts plus the political influence of each one. Part of my job has been simply keeping up with current issues in agriculture. I research them, interpret related legislation, and write briefs and memos for the Chairwoman and Ag Staff. My favorite part of the research included visits with livestock groups. I was surprised to see several familiar faces here in DC through various Michigan agriculture groups.

A few examples of the issues I worked on this summer included food safety, livestock marketing, and agriculture disaster assistance. The foodborne illness outbreak in Germany, involving STEC E. coli, led to the re-introduction of some food safety bills and increased pressure on government to regulate meat processing facilities. The 2008 Farm Bill required the Grain Inspectors, Packers, and Stockyards Administration (GIPSA) to make certain changes that would address fairness in the marketplace, specifically regarding vertical integrated in poultry production. The proposed rule, however, is very controversial as it will affect how all livestock are contracted and marketed. Researching contentious issues like this forced me to learn to look at things from many different perspectives. The 2008 Farm Bill had livestock disaster provisions, so I analyzed how the programs were utilized. This summer, we had the worst drought since the dust bowl, sustained record high temperatures, experienced floods, hurricanes and tornadoes that damaged livestock, facilities, and pasture... not to mention crops. The heat and drought were, in fact, so severe that the US now has the lowest cattle inventory since 1973.
Most commonly, I am responsible for science or veterinary-related issues such as antibiotic use in livestock, drug residues, and food safety. I’ve learned that the societal or political impacts are a lot more important to communicate than the “why” or “how” these things work. All of these topics are, in fact, far-reaching and I’ve found myself writing about trade, administration, foreign relations, etc. I hadn’t given much thought to a lot of these aspects of agriculture but I’m beginning to really appreciate their value.

This experience broadened my understanding of the role that veterinarians can have in society. Awareness of the challenges faced by producers, in a generation somewhat removed from agriculture, has motivated me to become involved in policymaking. My time with the Agriculture Committee has helped me gain a greater understanding of the decision-making behind policy so that I can better serve my clients, industry, and profession in the future. I now appreciate the responsibility we have to be active in the policies that affect our businesses, clients, and industries.

LEVI SMITH
CVM Class of 2014
PAC: Production Animal Consultation

Just West of the corn belt of Iowa and Missouri lies the feedlot cattle of America. Dr. Wade Taylor, CEO of Production Animal Consultation (PAC) was gracious enough to support me through a 10-week externship rotation with each of the six veterinarians that comprise the PAC group. This summer has been a lesson in feedlot medicine, animal handling, rectal palpation, and most importantly, client communication.

Starting with Dr. Kip Lukasiewicz in Ainsworth, Nebraska I was introduced to low stress animal handling and an overview of the veterinarian’s role in training pen riders, processing crews and hospital personnel. Dr. Kip contributes to PAC by providing custom facility designs to promote cattle flow and ease of use. I learned the importance of working with new pens of young cattle and how it can have a positive influence in cattle health. Dr. Kip and I enjoyed early mornings, long car rides, and lots of coffee.

In Oakley Kansas, Dr. Wade Taylor taught me how to analyze feedyard records to look for opportunities for improvement. He can illustrate to feedlot managers how only tenths of a percent in decreased morbidity can increased their profits by millions of dollars each year. Rather than spending tremendous time with individual cattle, Dr. Taylor looks at the larger picture. Using the PAC computer program they are able to compile millions of data points to analyze drug treatments, morbidity and mortality, and make science-based decisions on drug recommendations in particular scenarios. In addition, they are able to plot the progress of individual feedyards, comparing their personal statistics to the industry averages from all feedyards. He also showed me how to identify high-risk pens of cattle that needed special attention from the cowboys. Dr. Taylor taught me the proper way to throw a heel loop and we spent almost every night roping off of his three roping horses.
Dr. Tom Noffsinger is the most exciting, optimistic, and energetic man I have ever met. His focus and attention to every animal in each pen makes him really stand out. He chooses not to look for the sickest creature in the pen, but rather to find the healthiest and ask himself why the pen mate beside him is not as strong and healthy. With Dr. Tom the answer to the question is not usually a particular drug, but rather encouragement from a pen rider or pen walker to get that animal up to the bunk to eat or to the water tank to get a drink. Sometimes it is as simple as that. New pens of cattle are often times very timid and afraid in a new scenario with strange feedbunks and new watering systems. Dr. Tom is a very well traveled man, with frequent trips to Australia and Europe to discuss cattle handling techniques and better ways to handle heat stress, a particular area of interest to Dr. Tom. While my time with Dr. Tom was brief, I was able to enjoy long trail rides through his hundreds of acres of pasture, checking on his cows and calves.

Until recently, veterinarians have used rectal temperatures to determine the severity of a disease. However, the correlation between temperature and disease severity correlate very poorly. However, that is a strong correlation between lung sounds and pneumonia. Using the power of the human ear, Dr. Tom has developed a scoring system (1-6) to determine the severity of pneumonia and has used that information to decide the proper antibiotic. He encourages every cowboy to use the stethoscope and helps them train their ears to listen and rate the sounds the hear.

Dr. Doug Ford from Brush, Colorado not only helped hone my palpation skills, but also taught me how important is it to use your powers of observation and cause-and-effect reasoning to solve problems. We discussed unique and strange cases he was seen over the years and how he used simple powers of observation, and all his senses to determine the underlying problem in each scenario. With Dr. Doug, each day was a gift and each day was an opportunity to get work done. As long as the sun was shining, there was work to be done. I also had the opportunity to learn how to utilize an acetylene torch as well as Caterpillar D4 dozer driving lessons.

This summer’s experience has introduced me to a whole new level of knowledge, reasoning, and problem solving not only within the beef industry, but also within my own life and future career as a veterinarian. I have never felt so welcomed and cared for by complete strangers as I have this summer. Everyone took me into their homes, and treated me just like family. I was able to make life-long friends, learn a little about veterinary medicine, and a lot about myself.

TIM EAGAN
CVM Class of 2014
PAC: Production Animal Consultation

I consider myself to be extremely lucky to have been able to spend my time in the Food Systems Fellowship program with the men of Production Animal Consultation. This is a very prestigious group of feedlot consultant veterinarians. My first day of work opened my eyes to a scale of production I had
never imagined, and I spent every day thereafter trying my best to absorb the massive amount of information presented to me by each of the four veterinarians I traveled with. Travel seems to be a bit of an understatement looking back. We spent countless hours getting from place to place, and toward the end of the trip one of the veterinarians reckoned that we made all of 15,000 miles in the truck all total. Every mile was worth it, and much of what I learned came from conversations had in those long jaunts between feedlots.

My summer started in Oakley, KS, with Dr. Wade Taylor; the unofficial head of the group. Dr. Wade, as with the other doctors, welcomed me into his home immediately. The day after arriving I got to see my first major feedlot. One cannot grasp what it looks like to have 70,000 head of cattle in one place at one time until he sees it with his own eyes. This scale of production was the first thing that truly struck me. The second was the level of care that each of those 70,000 head received every day. Production animal agriculture gets a lot of negative attention for the poor treatment of animals by a minority of producers, but what isn’t often talked about are the people that do it right. At all of the feedlots I visited this summer every animal was checked for signs of sickness every day, which was very impressive to me.

Along with a different scale of production than I had ever seen came a different scale of medicine. A feedlot consultant veterinarian is tasked with the job of improving the health of all the cattle in the feedlot, and thus has a much bigger picture to look at than someone looking at a single animal. One of Dr. Wade’s areas of expertise was to examine trends in health data and use that, along with his knowledge of the other workings of the feedlot, to determine vaccination and treatment plans. He is also fortunate enough to work with his son and together they have developed their own computer program to track animal health in the feedlot. This has allowed their whole group to make more informed decisions; based on hard trends rather than anecdotal evidence.

The next member of the group that I was able to spend time with was Dr. Tom Noffsinger from beautiful Benkelmen, Nebraska. However, in two weeks with Dr. Tom I have to say we spent very little time in Benkelmen. Dr. Tom is an expert in low-stress cattle handling and is very passionate about teaching other people his techniques. One of the ways he expresses this passion is to travel farther and wider than anyone I know to spread his message. I learned from Dr. Tom that when cattle are under less stress, they perform better, respond better to vaccination and treatments, and can truly be “happy” animals. It’s one thing to hear these things, it’s another thing to live them.

Dr. Tom was very good at putting me in situations where I learned by doing, and the doing is what really solidified the concepts in my mind. He didn’t just tell me how to stop a group of cattle, he put me in front of about 100 head of fat cattle running down an alley towards me and then told me to stop them. Necessity is a tremendous facilitator of learning. I learned a lot about how to handle cattle, and more importantly how to read them in order to know how to handle them. The most significant thing that Dr. Tom was able to show me was that in a very short time I could change the cattle’s personalities and get them to want to work for me.

All of these experiences so far had been with beef cattle in feedlots, but the way this group of veterinarians thinks about and handles groups of cattle transfers well to the dairy side as well. My next stop was in Brush, Colorado with Dr. Doug Ford. Dr. Doug is primarily a dairy practitioner that focuses on pregnancy checks in large dairies. However, he also maintains a true mixed-practice as he works on horses and small
animals as well. Spending time with Dr. Doug allowed me to get a lot of experience with rectal palpation, most likely more than I will get in the next two years of school.

Dr. Doug also liked to try to impart wisdom as well as knowledge. He was able to use the simplest examples to teach fundamental principles essential to becoming a good veterinarian. The top lesson was to always work on being able to perceive the smallest details that are usually the most vital in solving a case or making a diagnosis. For example, someone who takes the time to observe and analyze the location of a few chips in a windshield can tell an awful lot about the way the operator is driving the vehicle. Dr. Doug also consulted in a few feedlots, and used these skills to find solutions to problems that most people easily overlooked.

Solving problems is a big part of what this group of veterinarians did, and a reality that they have accepted is that the job is not for people who like to see something completed. In a feedlot there are few problems that are completely solved. When one is, another one or two have usually already sprung up. Dr. Kip Lukasiewicz, the last veterinarian in the group that I worked with, enjoyed the challenge of being faced with continual problems. He was very good at figuring out how to solve them and he was very focused on education. Dr. Kip spent a lot of time teaching the workers at the feedlots the proper and lowest-stress ways to process and treat the cattle. He was also probably the most adamant about me actually learning to do things. Not just their thought process or why a deep pharyngeal swab is performed, but how to do the swab. I was also able to get involved in learning some surgery technique with his small animal associate Dr. Chere Stephen.

The major reason that Dr. Kip loved to teach these things is that, like the rest of the group, he was passionate about cattle being cared for in the best manner possible. He believed that producers are in a partnership with their cattle. In return for a safe, nourishing, and tasteful product those responsible for the cattle have a duty to treat them well and with respect. This helps the cattle, the producers, and the industry by improving product along with image. Dr. Kip not only taught me a lot about handling cattle and keeping them healthy, he propagated a comfortable learning environment by bringing me into his family and making me feel welcome.

The most unifying characteristic of the group of veterinarians at Production Animal Consultation, and one they all worked to impart to me, is their shared set of values. They all believe that becoming and staying a good veterinarian takes a lot more than getting good grades in school. A good person should put God first and family second; if they do that the rest of their life will take care of itself. Success comes with a responsibility to give back to people in need and invest in the future by helping up and comers. Producing cattle comes with a responsibility to treat them well. I learned a lot about feedlots, the beef industry, and veterinary medicine this summers, but these are the biggest things I took away from the experience.

- **DID YOU KNOW**-

  What is a Food Supply (or Food Systems) Veterinarian?
  “Veterinarians protect America’s – and the world’s – food supply from the farm to the dinner table”
  
  *American Veterinary Medical Association*
ERIC NAPLIN
MSU CVM Class of 2013
USDA APHIS VS Scrapie Eradication Program

I began my Food Systems Fellowship in May of this year with the Scrapie Eradication Program under Dr. Jean Ray. Dr. Ray is Michigan’s designated area epidemiologist for scrapie and tuberculosis. I also had the opportunity to work daily with two USDA Veterinary Services (VS) animal health technicians, Michelle Barrett and Katherine Meyer. My core duty this summer was to assist the animal health technicians with the Regulatory Scrapie Slaughter Surveillance (RSSS) aspect of the Scrapie Eradication Program.

RSSS is a core component of the Scrapie Eradication Program. It is the major way which VS defect’s scrapie positive animals in the United States. In Michigan, the majority of sheep and goats are slaughtered at plants in the Detroit area. VS have agreements with many of these plants to save the intact head from the slaughtered animals for pick up by a VS employee. The heads are taken to Michigan State’s Diagnostic Center for Population and Animal Health (DCPAH) where the USDA has biosecurity level 3 laboratory space to process the heads. Scrapie as well as other transmissible spongiform encephalopathies is detected in nervous and lymphoid tissues. The slaughtered sheep or goat heads are first identified as black or mottled faced. Then we age the animals by looking at their dentition. Any identification the animal has is recorded which includes official and unofficial ear tags as well as any tattoos or horns that may be present. The final step is collecting one retropharyngeal lymph node, the intact obex area of the brain stem, and the cerebellum. The lymph node and obex are then passed on to DCPAH for testing through histopathology. The cerebellum is saved frozen for genotyping at a later date in the event of a positive animal. If a positive animal is detected, Dr. Ray is notified and the process of tracing infected animals and eliminating positives begins. Toward the end of the summer we did have our first scrapie positive animal in the state for 2011. I was able to accompany a veterinary medical officer (VMO) to the farm for quarantine and blood collection for genotyping.

In addition to RSSS, VS was also conducting a voluntary National Animal Health Monitoring System (NAHMS) study on sheep this year. NAHMS does varying tests on specific species each year to get baseline information about our nation’s animal inventory. This year’s sheep study was testing for the prevalence of Mycoplasma ovipneumoniae, Coxiella burnetii, enteric pathogens and parasites. Producers were initially contacted and asked preliminary questions about their flock and husbandry practices. I assisted the attending VMO in restraint and collection of samples. We collected blood, nasal swabs, fecal samples, and dirt or litter from each farm. The VMOs also do TB testing throughout the state and I was able to participate at a couple farms. I
also gave an informational talk to 4H participants at the Cass county fair on the biology of scrapie and tagging requirements for sheep and goats in Michigan.

I enjoyed working with everyone this summer and I really received an in depth view of the inner workings of the USDA and what responsibilities epidemiologists, VMOs, and AHTs have. I would recommend this FSF experience to any of my student colleagues.

HENRY REINART
CVM Class of 2014
Merck Animal Health

This past summer I worked with Merck Animal Health (Formerly known as Intervet-Schering Plough Animal Health). Although my mentor was Dr Mike Bolton, a Dairy Technical Services Veterinarian, my summer consisted of traveling around the country with many Technical Service Veterinarians.

On my first trip, I flew into Lincoln, Nebraska. I was picked up by Dr Bill Burdett and we traveled around eastern Kansas. We spent the next two days talking to local beef cow/calf veterinarians about some recent studies regarding their Vista Vaccine. We also stopped by Kansas State University and discussed these studies. This trip was good experience because I got the opportunity to see how technical service veterinarians interact with practicing veterinarians as well as their relationship with the sales staff. I also was able to see what issues beef producers had in eastern Kansas and see how they varied from the issues that face producers in Michigan.

The next trip I took was with Dr Bolton to Kansas City. The first day was spent at Osbourn and Barr, a communications company specializing in agriculture enterprises. After lunch several members of O&B staff and members of the Merk dairy team discussed their new Dairy Cattle Handling Training series. These discussions involved both selling the idea to consumers as well as how to present the idea to senior management. The next day we went to the Intervet/Schering Plough Animal Health US Headquarters located in DeSoto, Kansas. I got the opportunity to sit in on a meeting between Merk veterinarians and marketing Staff and a smaller company attempting to sell interest in a product that they had gotten through USDA approval but didn’t have the resources to begin manufacturing. This was probably one of my best trips because I had no idea the amount of non-clinical decisions that had to be made before a product was brought to market.

My next trip was a little closer to home when I attended Dairy University, a continuing education conference for dairy sales staff at a hotel in Merrillville, Indiana. I got to sit in several regional meetings where regional managers discussed goals, problems and
successes of their particular region. Some of the guest speakers included Dr Mike Overton from the University of Georgia who presented a short training session on Dairy Comp 305 and Select Sires employees that gave a brief overview of their company and the semen industry as a whole as well as some of their heat detection programs. This trip was very interesting since I got to talk to sales staff from all corners of the United States and even had a very nice conversation with a technical service veterinarian from Quebec where we discussed differences between the US and Canadian dairy industry.

The next two trips that I took were to lower Idaho where I helped Dr Andy Skidmore, a Merk Technical Service Veterinarian, and Dr Scott Tripp, an independent consulting veterinarian perform a milk effect trial comparing one of Merk’s products with a competitor. This was very hands on trip and I got the opportunity to relate my research methods class to real life. I was able to learn about what makes an experiment powerful as well as unbiased. Both of these are important if the results are questioned by the competition or USDA.

I made a second trip with Dr Bill Burdett out west. I arrived in Denver, Colorado where we moved our way east into the Sand Hills of Nebraska. While we were there we talked about ectoparasite control with a couple different veterinarians that focus on beef cow/calf herds. I also got the opportunity to tour the USDA Meat Animal Research Center outside of Clay Center, Nebraska. At this center they have a number of projects including how to find the genetic markers responsible for increasing the number of offspring produced by cattle, sheep and swine. Other projects include finding ways to make feedlot cattle more efficient in converting feed to lean tissue growth. The actual facility was a WWII-era ammunition storage facility that is now used to graze tens of thousands of beef cattle and sheep among the surviving ammo bunkers.

The next trip was to Ithaca, New York with Dr Mike Bolton. We went to a dairy farm that was currently utilizing the Pulse Gun needle free syringe and met with a sales representative for a company that is selling the next generation of needle free systems. Although the sales pitch went south I learned a lot regarding this new class of medication dispersion. We also visited Cornell University and I got to see a salesman in action as he tried to make a program for one of the University’s client that would be appropriate for the University’s unique situation.

My final major trip was in the Denver area with Dr Denny Hausmann who is a Technical Service Veterinarian for Merck Animal Health. Dr Hausmann spends his time focusing on large beef feedlots. We visited a couple feedlots while in eastern Colorado. One has a one-time capacity of 18,000 head and had facilities to do research trials. The other feedlot was one of the Five River’s feedlots with a one-time capacity of over 100,000 head. This lot had both management extremes. The majority of the feedlot cattle are given Zilmax while 12,000 are in natural programs without implants or feed additives. While I was at this lot I saw the first hand consequences of the drought in Texas as there were many pens full of young thin Texas calves that had to be moved to the feedlots early. This was a very eye-opening experience since the largest feedlot I have ever been on was a small Michigan lot with a 5,000 one-time capacity. I also learned a lot with regards to feedlot disease and the ways that feedlots combat these diseases.

My last official task as an intern with Merck Animal Health was just a few miles from my house. I visited a farm outside of Wayland, Michigan where Dr Bolton and Dr Paul Rapnicki, a Dairy Veterinarian Professor from the University of Minnesota. They presented a training session on how to move cattle for the workers at this farm. This was
a very neat opportunity since I had heard about these training sessions a number of times during the summer but I never had the opportunity to sit in on one.

My summer with Merck Animal Health was one that I will always remember. Not only did I get to fly 22,000 miles across the country and visit with people from all aspects for the dairy and beef industry, but I really learned how the pharmaceutical industry works. I would really like to thank Dr. Mike Bolton who arranged the entire summer; the veterinarians that I rode with, Drs. Burdett, Skidmore and Hausmann; and all of the sales and marketing staff that I met along the way, you all made my internship that much more enjoyable.

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MICHAEL NOWICKI
MSU CVM Class of 2014
AntelBio

Antel Bio is an animal testing company owned by Northstar Cooperative. Northstar Cooperative has many other companies servicing different aspects of the dairy and beef industry, including reproductive services, mating services and semen sales. Antel Bio is able to partner with the regional dairy herd improvement (DHI) lab to offer laboratory tests to dairy farmers. DHI is a program of testing milk monthly for its main constituents to aid the farmer in making management decisions. After the DHI lab has completed its analysis, Antel Bio is then able to take the remaining milk sample and gain more information by testing for diseases and pregnancy. This is very convenient for the farmers who participate in DHI testing.

During my time with Antel Bio this summer I was responsible for producing preliminary data for a grant to quantify a cow’s response to stress through cortisol levels. The first third of the summer was spent performing a literature review, discovering the actions of cortisol within a cow and how this changes when stressed. During this time, I also spent time in the lab operating both ELISA and real time PCR. This was an educating experience because it allowed me to understand why test results are not instantaneous. This was especially true for the fecal Johne’s real time PCR which took two days to produce results.

In conjunction with the cortisol work, I was responsible for researching pregnancy associated communication molecules. This was paired with mass spec analysis of milk from both pregnant and open cows. My primary responsibility with this project was to preserve and process milk samples for later mass spec analysis. This was interesting as there were no concrete procedures on how to process milk samples for mass spec analysis. I was provided great support from Dr. Dan Jones of the MSU mass spec facility in the process of obtaining useful data by the end of my summer study.

During the second third of the summer I was responsible for finding a specific test for milk cortisol that had been previously shown to be accurate. This included critiquing
many of the papers that I read during the literature review phase. I was fortunate enough that an available test found in my literature review was successfully used in prior research. Finding this test was the limiting factor in producing data for the grant. While I was not working on cortisol research, I was able to get out of the office and discover firsthand what the other branches of Northstar Cooperative had to offer. This experience began with a reproductive specialist who evaluated the success or failure of a farm’s breeding management program. This was followed by my experiences with a mating specialist who evaluated the conformation of heifers and cows in order to match them to a potential breeding bull with complementary conformation. There are many different conformation differences that can maximize the productive life of commercial cows, and thus improve the genetic quality of their offspring in order to cut costs for a farmer. I was also able to ride along with an artificial insemination technologist in Indiana. This was a great opportunity to use my reproductive physiology knowledge first hand. In addition to these experiences, I also rode along with a semen salesman who drove around northern Michigan servicing the farms need for semen and liquid nitrogen.

During the last third of my summer with Antel Bio I was able to collect milk samples before and after foot-trimming, which was used as a stressful event that could affect cortisol levels. I collected samples once before and twice after the foot-trimming. The milk samples were persevered for the mass spec analysis and frozen. I conducted the cortisol test on the milk and compiled the data. After the test was completed I analyzed the data and put together a presentation for the entire Antel Bio team. My research showed an increase in cortisol levels after the foot-trimming and a return to normal levels shortly after that. The interesting part of my analysis was the response to stress across age groups. The older cows had a larger response to the stress than did the younger cows. The cause of this was not determined while I was there. It was very rewarding to have taken something from research, to experiment, to results in one summer.

In the end, I had a great summer working with some great people at Antel Bio. The team was very patient with my lack of lab skills and was always willing to help. There are many interesting projects that are going on and the personal nature of the team was very comfortable to learn and work in. I couldn’t think of a better summer experience.

JUSTINE O’MALLEY  
MSU CVM Class of 2014  
National Pork Board

When you think of a veterinarian what do you see? Most people envision the doctor with the animal, treating and healing it. As an individual pursuing a career in veterinary medicine, I am aware of the opportunities of doing field work and practicing actual medicine but I was curious about what other opportunities were available. Therefore, my expectations from this internship through the Food Systems Fellowship were to get
exposure to other veterinarian job opportunities, gain industry experience, and learn about swine. This internship has both met and exceeded my expectations. I must honestly say that this was the best thing for my career. I learned that there are other important roles a veterinarian can perform beyond practicing in the field, I gained industry experience by seeing the role of the National Pork Board, I learned an immeasurable amount of information about swine and swine health, and I was able to network significantly. In addition, I received exposure to the role and opportunities available to a veterinarian who is interested in Public Health which was good because I am interested in pursuing a Masters in Public Health upon graduation from veterinary school. These experiences were achieved through several different meetings, projects, and events. Listed are some of the opportunities I was fortunate enough to participate in:

- Antibiotic resistance and surveillance meetings at the Centers for Disease Control
- Public Health and Producer Safety sub-committee meeting
- Swine Health committee meeting
- Pork Safety Quality and Human Nutrition committee meeting
- Animal Welfare committee meeting
- Secure Pork Supply meetings with Jim Roth and Patrick Webb
- Foreign Animal Disease outbreak table-top exercise
- World Pork Expo
- OMS training
- TQA Advisor training
- Visit a producer’s farm in Iowa
- Shadow a swine veterinarian
- Visit Premium Standard farms
- Tour the Hormel plant in Austin MN
- PQA Plus training
- Create a presentation about animal welfare that was presented to Animal Welfare committee members
- Create educational presentation for plant employees regarding Foot and Mouth disease and Swine Vesicular disease
- Collect electronic versions of Safe Pork Symposium proceedings
- Create spreadsheets regarding NPB funded swine health and public health research
- Contact State veterinarians regarding PRRS and how it’s reported

I cannot thank the National Pork Board and the industry enough for all these wonderful experiences. This internship has given me a new appreciation for the pork industry. The passion that the producers and all those involved in the industry possess to always be ahead of the game is astonishing. I was surprised by how much the producers care about their animals and the concern they have for meeting their consumer’s needs. I look forward to continuing the relationships I’ve made and learning more about swine, pork, and the industry. I hope to one day be a part of such a spectacular industry.

**-AG FACT-**

Nearly two million people farm in the U.S. Almost 90 percent of U.S. farms are operated by individuals or family corporations. And American agriculture provides jobs—including production agriculture, farm inputs, processing and marketing, along with retail and wholesale sales—for 15 percent of the U.S. population.

North Carolina State University CANS
This past summer I had the opportunity to work for the Michigan Department of Community Health (MDCH) through the Food Systems Fellowship program. MDCH serves Michigan residents in a variety of ways. The department is responsible for managing Michigan’s Medicare and Medicaid program, tracks vaccination and health records of Michigan’s citizens, educates and provides consultation for the public and health care providers on a variety of diseases, and monitors and investigates disease outbreaks. For my internship, I worked Dr. Kim Signs and Dr. Mary Grace Stobierski, who are both veterinarians, and Eric Foster, their Medical Entomologist in the Zoonotic Diseases & Special Projects Section in the Communicable Disease Division. During my second year in veterinary school, I started to consider a career in the public health field. Through this internship, I was able to gain the experience and understand what a career in public health would be like, and I am grateful for the opportunity.

Soon after my first day, we attended the annual Communicable Disease conference in Bay City, Michigan. The conference introduced me to the responsibilities of both local and the state Health Department, and the common problems they face. In addition, I learned about some recent disease outbreaks, the details behind their spread and the steps taken to bring them under control. I also learned about the computer system MDCH uses to track cases and monitor for disease outbreaks. Throughout the rest of the summer, I was able to go to several more conferences around the state, including Michigan’s Food & Agriculture Gateway Summit. This conference dealt with the food supply chain, terrorist threats to our agriculture and food infrastructure, and expanding Michigan’s agriculture economy and trade. It was certainly something I knew little about, yet they are very important issues for Michigan agriculture, economy, and public’s wellbeing. Sharing a table with the Michigan Department of Natural Resources at the Michigan State Ag Expo, I got the chance to educate farmers about health risks and diseases they might be particularly at risk for, such as rabies, Lyme disease, and Tuberculosis.

Disease surveillance and accurate knowledge of disease ranges and processes are essential tools for education and proper testing and treatment recommendations given by the MDCH. MDCH therefore, in collaboration with Michigan State University, is involved in active surveillance programs and research to guide risk assessments of various diseases. I was able to participate in two of these projects, the Lyme disease and Eastern Equine Encephalitis (EEE) surveillance programs.

Lyme disease in Michigan was first found in the southwestern edge of the state. Since then, the disease range has spreading up the Lake Michigan shoreline. Active surveillance of the presence of the disease in ticks and rodents is done at the edge of the known endemic counties. As part of this, I was able to travel to Sleeping Bear Dunes and the Manitou Islands both located in Leelanau County, where Lyme disease was endemic in a neighboring county but had not been found within the county yet. We trapped and biopsied mice and squirrels, collected ticks attached to the rodents, and dragged for tick
in the woods. All biopsies and ticks were submitted for Lyme Disease testing at MSU. Samples this year were found positive, and due to these and other efforts Lyme disease is now known to be endemic in four more Michigan counties.

Similarly, EEE is frequently found in southwestern Michigan. Again in collaboration with MSU, MDCH does EEE surveillance to understand the risk and range of the disease throughout the state. As part of this program, I collected mosquitoes in southwestern Michigan and submitted them for EEE testing.

During my time spent in MDCH’s downtown Lansing office, I was also able to work on several disease outbreaks. Through the disease reporting and surveillance system used by MDCH, three confirmed cases and three suspected cases of a very rare disease called Q fever were reported in a cluster around Livingston County. Using epidemiologic tools it was determined that the very probable cause was the consumption of raw milk. All cases were members of the same raw dairy co-op. This case gave me the opportunity to participate in the case investigation and phone meetings with the Michigan Department of Agriculture and Rural Development and Local Health Departments. In a similar manner, I participated in a salmonella outbreak associated with backyard chicks, and a cryptosporidium outbreak associated with a Holstein calf farm. I swabbed chickens and submitted the samples for salmonella testing and collected water and fecal samples for cryptosporidium testing.

All this supplemented my own research project where I designed and analyzed a survey about rabies post-exposure prophylaxis treatments at the Local Health Department (LHD) level. The information I collected was vital to understanding how many rabies PEP treatments are still given by LHDs and at which LHDs. The survey data also gave estimates for how many PEP treatments are given statewide per year and the cost of these treatments, identified problems with reporting of animal bites and rabies PEP treatment, and indicated ways to improve the communication between agencies and streamline the reporting process. I presented this information in a PowerPoint presentation and discussion to a working committee at MDCH.

The summer flew by, and as I look back I am incredibly thankful for all the opportunities I was given and everything I learned working for MDCH this year. There were many people at the department that made it possible, but I would especially like to thank Dr. Kim Signs, Eric Foster, and Dr. Mary Grace Stobierski. It was a great experience, and I highly encourage other students with an interest in public health and infectious diseases to apply.

--- AG FACT ---
- Michigan has 361,000 dairy cows, residing on approximately 2,100 dairy herds.
- In 2010, dairy cows in Michigan produced approximately 8.3 billion pounds of milk, which is essentially 1 billion gallon of milk.
- Michigan ranked 8th in U.S. milk production in 2010, producing 4.3 percent of the nation's milk.
- The dairy industry in Michigan contributes $5.9 billion to the state's economy.

*United Dairy Industries of Michigan*
This past summer, my food systems fellowship allowed me to work with veterinarians and epidemiologists at the Michigan Department of Community Health (MDCH). We monitored zoonotic and vector-borne diseases and I was able to participate in disease outbreak investigations and surveillance. I attended multiple conferences, worked in the office on disease surveillance and partnered with Dr. Jean Tsao and Dr. Mike Kaufmann at Michigan State University to do Lyme disease and Eastern Equine Encephalitis (EEE) surveillance across the state.

Over the summer I attended multiple conferences that addressed issues concerning the health of people that deal with animals and food products. The first week of my internship I attended the Communicable Disease Conference in Bay City, Michigan. This was a great opportunity to see how the State works with the local health departments to deal with problems that they may encounter. Presentations were given on recent outbreaks in the state, disease prevention and how the state is continuing to monitor these notable diseases. I also attended a food safety seminar in Plymouth, Michigan that addressed the concerns with trafficking food and animals across the Michigan/Canada border and how we are working to make this a safe and efficient process. This was also a great opportunity to network with USDA veterinarians that have a role in food and animal regulation within the state. Other meetings throughout the summer addressed how the state laboratory works with MDCH to test and monitor disease samples and outbreaks and to discuss new and ongoing cases that the state is dealing with.

Within our department we had a few notable cases that I was able to help with this summer. In southeast Michigan, 3 people were confirmed sick with Q fever. All 3 individuals were raw milk drinkers and are linked to the same cow share program. I worked with Dr. Mary Grace Stobierski and Dr. Kim Signs on detecting the common source of the infection, developing a press release for the public and creating a handout that details the risks associated with raw milk and the diseases associated with it. I helped with a suspected salmonella outbreak by swabbing chickens and collecting information related to exposure to the birds. We also monitored the confirmed and suspected cases of rabid animals that come in to contact with people and provide guidance to those that may need post-exposure prophylaxis treatment. In southeast Michigan, the state also saw its first confirmed woodchuck with rabies.
My main project this summer was teaming up with Dr. Tsao and Dr. Kaufman from Michigan State University to do Lyme disease research and EEE surveillance.

To study the prevalence of Lyme disease in Michigan we trapped chipmunks, deer mice, rabbits and birds along the west coast of Michigan. This included trapping at Van Buren State park, Sleeping Bear National Park and 2 trips to South and North Manitou Islands. Each small mammal that was caught was checked for ticks, tagged and had skin biopsies taken from both ears. This was done to see if the animal was infected with the bacterium (Borrelia burgdorferi) that is responsible for Lyme disease. Ticks that were removed from the animals were identified and then sent in for testing to check for Borrelia infection. This was important to see if Borrelia had traveled up along the west coast of Michigan and if it was prevalent on two different islands just off the mainland of Michigan.

The other project I was involved in this summer was the collection and testing of mosquitoes for EEE and West Nile virus. Traps were set up to collect mosquitoes in southwest Michigan where infected horse or human cases were reported. Mosquitoes were then sorted and identified and then sent in for testing. I was able to work with horse owners to identify the source of the infection and how proper vaccination can prevent the spread of the virus from mosquito to horse.

Overall, this fellowship was a great opportunity to learn more about the veterinarian’s role in public health and how they are working to keep the interaction between animals and humans as safe as possible. This includes developing proper protocols for disease prevention and to identify and control suspected outbreaks. My experiences this summer will help contribute to my development in becoming a well rounded veterinarian.

**TARA GRAVELYN**  
**MSU CVM Class of 2013**  
**MDA - Bovine TB program**

The state of Michigan is generally recognized for its car production and the Great Lakes. Cows are not usually the first thing that comes to mind when the public thinks of Michigan and its economy. Despite this lack of awareness by even Michigan’s own citizens, agriculture is the second largest industry in Michigan with cattle contributing three tenths of a billion dollars annually to the economy. Unfortunately, Michigan cattle are uniquely threatened by Mycobacterium bovis, the bacteria that causes bovine tuberculosis, which is endemic in our whitetail deer population. Through the diligent efforts of the Michigan Department of Agriculture (MDA), bovine tuberculosis has been confined to a small area in the Northeast part of Michigan.
Michigan’s Lower Peninsula. This summer I had the privilege of interning with the MDA, specifically in the bovine tuberculosis section of Animal Industry Division under Drs. James Averill, Rick Smith, and Mike Vanderklok.

I was fortunate this summer that my time at the MDA was evenly split between job responsibilities and learning opportunities. In terms of my own contributions, I helped to update the USAHERDs database, completed a research project on gamma interferon data, and created posters for custom slaughterhouses. USAHERDs is a database system that MDA recently converted to as a way to better track Michigan cattle to ensure that if a case of bovine tuberculosis is confirmed all possible exposed cattle can be traced, tested, and appropriately handled. Since the MDA is still working off an additional database system that field veterinarians use for scheduling testing there are often inconsistencies like producers being listed as active that clearly haven’t owned cattle for years or vice versa. I compared these two databases and corrected hundreds of these discrepancies. These corrections will help ensure that the MDA is not forgetting to test certain herds and is not wasting time tracking down producers that have gotten out of the business.

In addition to the database updates, I also studied the relationship between gamma interferon values and the presence of gross lesions to see if there was a positive correlation. In particular, I investigated whether as the Bovine-Avium (B-A) optical density value (the value used primarily to determine if a cow is positive for TB) increased, does the likelihood of a cow having gross lesions increase as well. The USDA provided me with results from the nearly 10,000 gamma interferon tests completed in the past four years as well as the IDs of the 47 animals that had gross lesions from bovine tuberculosis in that same time period. I compiled all this data into excel and then ran basic statistics as well as chi-squared tests on all the data. I found that as the B-A value increased the risk of having a gross lesion increased as well.

My final job responsibilities included generating posters that will be displayed in custom slaughterhouses around Michigan. The posters explain in lay terms how to recognize suspicious lesions and what to do if workers find anything unusual. In addition, custom slaughterhouses are supposed to collect all RFID tags from slaughtered cattle and return them to the MDA so that cattle can be properly tracked. I created a poster that explained what an RFID tag was and what should be done with them.

Beyond my work responsibilities, all three of my mentors made it a priority that I learn as much as I could during my 12 weeks at the MDA. I had numerous opportunities for one-on-one time with each of my mentors to learn about their specific duties, backgrounds, and opinions about the bovine TB program. I learned all about the Memorandum of Understanding with the USDA that sets general guidelines for the TB program and the Code of Federal of Regulations that lays out specific rules for movement of cattle and testing protocols. Dr. Smith thoroughly covered the Wildlife Risk Mitigation Program which is designed to prevent new infections of bovine TB rather than just reacting to cases. Danielle Jehn, my fellow intern, and I were allowed to attend numerous conferences including a national USDA meeting on changing the U.S. Bovine Eradication Program as well as the Governor’s Summit on Agriculture.

Our learning opportunities at the MDA were never confined to the Lansing Office. We traveled to three different livestock markets to not only learn about the USAHERDs tracking system, but to also gain understanding of general practices in markets and how dairy, beef, and swine are sold. Danielle and I also travelled to Atlanta and Gaylord to
actually go onto farms and see how a Wildlife Risk Verification is completed and to spend a day working in the Gaylord Livestock Market. We went to multiple farms to TB test and saw both caudal fold and comparative cervical tests completed. Finally, we were given free rein to seize any opportunities that interested us outside of bovine TB. We helped drug-test at three different standard bred races, visited feral swine farms, and even learned about the Large Animal Carnivore Act when we stumbled upon a private zoo.

When I started this summer I had hopes to learn about the bovine TB program in Michigan and to get a general understanding of regulatory veterinary medicine. At the end of the 12 weeks, I certainly can’t say I understand all the details about MDA’s TB program, but I know I have much better appreciation for the complexities of the program and for the roadblocks that Michigan faces in eradicating TB. I also now have a thorough appreciation for field veterinarians who are expected everyday to wrangle cattle, inspect animal shelters, investigate and control disease outbreaks, and remain composed in the face of many angry producers. I am so appreciative that my mentors and the entire staff at the MDA made it clear that Danielle and I were always free to ask questions and welcome to tag along on any field opportunity. I must admit I learned more this summer than I ever did in the classroom by just being able to pick the field veterinarians’ brains as we drove from farm-to-farm or just having a mentor stop into my cubicle and being able to question them about whatever detail was confusing to me. I cannot thank the MDA, all my mentors, and the Food Systems Fellowship program enough for this amazing opportunity.

ELISHA RICHARDS
MSU CVM Class of 2013
Neogen Inc.

Neogen Corporation is a food safety company with its headquarters situated in Lansing, Michigan. My summer experience was in a dairy research and development laboratory, which works to develop and refine rapid diagnostic test kits for use in the field. The projects that I contributed to were specifically for the detection of antibiotic residues in raw, commingled milk using lateral flow technology. Lateral flow test kits, such as the BetaStar Combo kit are quick and easy to use. I learned a great deal about lateral flow technology, while also sharpening my information integrating skills.

The first two weeks of my internship were spent learning the basics of lateral flow technology. I observed in the laboratory and manufacturing facility, and gathered information about the steps of researching the need for a lateral flow test, and the process of designing, fine tuning and producing a test kit. I learned the basics of lateral flow technology with BetaStar Combo as my example.
The BetaStar Combo kit uses lateral flow to detect tetracycline and beta-lactam antibiotics in milk. The concentration of drug detectable by the BetaStar Combo kit is based on what regulating bodies, like the FDA, determine to be unacceptable levels in milk. In the BetaStar Combo kit, a small vial filled with test reagents is provided to the customer, as well as the lateral flow devices. The devices are essentially dipsticks with a sample pad, test membrane that has more test reagents streaked onto it in three lines (one test line for each drug and one control line), and a wicking pad. Milk is added to the reagent vial and allowed to incubate before the device is added to the assay. The device is placed in the reagent vial and the reagent and milk solution flows up the device. Presence of drug in the milk will cause a different reaction with the reagents, and therefore affect the visual outcome of the test. At the end of the test, the device is read visually and with a scanner. If tetracycline or beta-lactam antibiotics are present in the milk, the test line for that drug will be lighter than the control line.

After I learned the basis of the research being done in the lab, I was able to get a great deal of hands-on experience running experiments and analyzing data. Although I am unable to specifically discuss the results of the project experiments, I can say that the overarching theme of my work was to assist in the development and refinement of existing lateral flow technology so that testing in the field is as efficient as possible.

As a future large animal veterinarian, I will play an integral role in food safety. I can apply a great deal of knowledge and principles gained from working at Neogen to my future work as a food animal veterinarian. It will be my responsibility to see to the health of food animals, as they grow and enter the food production system. As it specifically applies to the laboratory that I worked in, I will be held accountable for treating animals with appropriate antibiotics as necessary and ensuring that the animal is removed from production until the drug is sufficiently cleared from the body. I will need to know what drugs are acceptable to use in that particular animal, what the withdraw time is, and what levels of drug are unacceptable in raw, commingled milk tested from bulk tanks. Using lateral flow and other technologies will help me and other people involved in the food production system to identify drug residue in milk, thereby producing an acceptable product for market. Food safety will be a part of my career as a food animal veterinarian, and with my new understanding of the development of diagnostic test kits, I will be that much more equipped to serve my clients.

I now have a very thorough understanding of lateral flow and will be able to efficiently use and troubleshoot such test kits in the field. Research and development laboratory work also gave me a crash course in the application of trial-and-error science which will be useful when I come upon unusual cases in my career. The search for ways to develop and improve lateral flow test kits was a process of trying new ideas and integrating all of the data from previous experiments. When confronted with an unfamiliar or difficult situation on the job, I will be more comfortable integrating all of the information at hand and using my best judgment to find the solution. Working in research and development at Neogen afforded me the opportunity to learn about the use of lateral flow technology in food safety and develop skills that will make me a better veterinarian.

My internship at Neogen provided me with knowledge on why and how lateral flow diagnostic test kits are developed, while also refining my troubleshooting and information processing and integrating skills. The experience in the research and development dairy laboratory enhanced my education at Michigan State University College of Veterinary Medicine and will have a positive impact on my career as a food animal veterinarian.
This summer, I had the opportunity to work at Neogen as part of the Food Safety Division located in East Lansing. Neogen was founded in 1982 and has multiple locations within the United States and internationally. As stated on their website, “Neogen excels at helping to identify safety concerns in the vast and changing landscape of food and animal safety.” Neogen is involved in food safety, animal safety, culture media production, diagnostics, biotechnology, and genotyping of microorganisms. I worked in the Pathogen Detection microbiology laboratory with the Research and Development group.

The project that I focused on was involved with the initial development of a diagnostic test for bovine mastitis that will be used by dairy producers and veterinarians as well as others in the agriculture industry. The project consisted of laboratory bench work investigating antibody-based immunoassays that can detect the presence of bacteria in cow’s milk, the collection of milk samples from cows with clinical mastitis, and bacterial analysis of the milk samples. This project was particularly interesting for me because I have a background in microbiology (Bachelors of Science in Microbiology), and I am particularly interested in this aspect of the agriculture industry. I had the opportunity to put into practice many of the techniques, tests, and skills that I had previously learned about only in theory.

The majority of my first week at Neogen was spent reading background information about the project with which I would be involved. I also read about some of the tests and laboratory methods that I would be using during the project, such as direct and indirect Enzyme-Linked Immunosorbent Assays (ELISA). ELISAs are used in diagnostics as well as in research and development and utilize the principle of the natural interactions that occur between antigens and antibodies. During this project, I learned how to prepare ELISA plates as well as how to use the plates as part of experimental testing.

Once all of the necessary materials for the project arrived, my mentor trained me on the ELISA technique and taught me the protocol that would be followed so that I could work independently on the project. I prepared bacterial cultures by streaking a frozen sample for isolation, selecting and inoculating media with an isolated colony, and then washing and preparing a titer of the bacterial culture. I used the bacterial cultures to prepare ELISA plates by diluting the culture to a certain concentration and placing a small
amount of the culture in each well of the ELISA plate. A blocking solution was used to ensure that the antibodies, once added, would not adhere to the plastic of the wells but only to the antigens present on the bacteria. Neogen acquired several different antibody samples that were to be screened using the ELISA plates that I had made. A diluted portion of each antibody sample was added to the wells of the ELISA plates. A secondary antibody, that was conjugated to an enzyme and also designed to bind to the primary antibodies, was added to the wells. Finally, the substrate for the enzyme was added, and a blue color would develop at various intensities to indicate the relative quantity of the primary antibodies present in the sample that reacted and bound to the bacterial cultures. This process was very long as the plates had to be incubated for 45-90 minutes and washed between each step. I learned how much patience is involved in preparing and running ELISA tests.

Another part of the project involved culturing milk samples collected from dairy farms onto different selective media plates. I learned how to prepare some of the bacterial growth media myself while some of the media was purchased from another company. The purchased plates were specifically designed to determine what types of bacteria may be present in a contaminated milk sample. I went to the Michigan State University Dairy Teaching and Research farm to collect milk samples from cows with high somatic cell counts. I also went to Green Meadows farm to collect milk samples from cows that had clinical mastitis. The milk samples were cultured on the selective media plates, and isolated colonies were selected for identification via Gram stains and analytical profile indexes (API). APIs are strips containing multiple wells that contain the reagents for different analytical tests. An isolated colony is inoculated into sterile saline, and a portion of the solution is placed in each well. After 24 hours, each test in the API is scored as positive or negative. The results are entered into an online database that provides the potential identification of the organisms. In some cases the identifications are 99% accurate while alternatively some of the identifications are only 30%, 50%, or 75% accurate. When the identifications are not as well known, additional analytical tests are run to better differentiate the type of pathogen causing the infection. The time required to perform culture based identification tests gave me a better appreciation for the benefit of a quick and simple test, which can aid veterinarians and dairy producers to identify mastitic animals.

My experience at Neogen was irreplaceable. I learned a lot about the time and effort that goes into developing the diagnostic tests that veterinarians use every day. There were several times during the project when the defined protocol for the ELISA experiment did not produce adequate results. Since the procedure that I was using was experimental and had not been utilized before, I often had to troubleshoot with the other researchers to determine what changes could be made to improve the protocol. I have learned to appreciate the team effort required to make an enriching and exciting work environment. This fellowship was a great experience and helped me to improve many skills that will be utilized in my veterinary career.

**AG FACT**

In 2010, there were nearly 1.1 million head of cattle in Michigan, 1.04 million head of hogs, 74,000 head of sheep and lambs, 10,800 goats and 12,822,000 chickens. 

*USDA NASS*
This summer, I worked with the Michigan Department of Agriculture and Rural Development (MDARD) to assist in conducting voluntary Viral Hemorrhagic Septicemia virus (VHS) surveillance testing at licensed private fish farms in Michigan. VHS is a viral disease that can cause high mortality events. VHS strain IV b, a unique strain found only in the Great Lakes region, is of great concern because it has the ability to affect numerous fish species and it has already been found in all five great lakes and some inland water sources in Michigan. Both the Michigan and United States Departments of Agriculture are concerned with the potential of VHS spreading to fish farms, which could lead to a mortality event that could potentially hurt both the industry and the environment.

My first step at MDARD was to learn about VHS. I learned that strain IV b was first found in Michigan in 2005, and that VHS can affect over 40 species of fish. It can spread by many different means, including direct contact with infected fish, water containing body fluids of infected fish, wildlife predators, and equipment such as trucks, nets, or waders. Though VHS is deadly to fish, there is no health risk to humans by consuming VHS-positive fish products. I made an informational brochure regarding VHS and biosecurity practices, which was given to fish farmers and is also available online at: http://michigan.gov/mdard.

I learned that in order to raise fish for profit in Michigan, you must be licensed with MDARD. We currently have 56 licensed fish farms in the state. I contacted all licensed facilities that raise VHS-susceptible fish species by phone or email about participating in the VHS testing program, and 12 farms agreed. Michigan fish farms produce fish for many different reasons, which vary from raising fish for stocking in public waters, to use as bait, to sell as food to restaurants or individuals, or for fee fishing activities. I had the opportunity to see all of the different types of facilities listed above. Michigan fish farmers also use a variety of methods to culture the fish: in ponds, cement or land raceways, or plastic tanks. It was interesting and encouraging to see the great variety of fish that are raised in Michigan, including panfish, trout and char (even Arctic Grayling!), walleye, bass, minnows, and many more. Michigan has the potential to be a leader in the aquaculture industry, but at this point it is still quite small and developing. I really enjoyed being able to meet the aquaculture producers, a group of people that are extremely passionate about their fish and the aquaculture industry. It was encouraging to see the quality fish products that are being produced right here in Michigan!
Unfortunately, the only accepted method of testing for VHS (and several other fish diseases) is by testing tissue samples, which means the fish must first be euthanized. We were as humane as possible when euthanizing the fish to collect samples. If the farmer did not wish to keep the fish for food, we euthanized them with a chemical known as MS-222. It is commonly used on fish farms as an tranquilizer or anesthetic for egg or milt (sperm) collection, fin clipping or tagging, immunizing, etc and in the pet fish business for surgeries, physical exams, and more. If used at the correct dose, it induces a quick and humane death. Fish euthanized with MS-222 needed to be buried to prevent injury or death to wildlife that may prey upon the carcasses. If the farmer wished to fillet the fish for food, MS-222 was not used because it would be unsafe to eat the meat. In this case, we pithed the fish, which is also considered humane euthanasia for fish by AVMA.

At each participating farm, samples from the heart, spleen, and kidney of 60 fish were submitted for VHS testing. I really enjoyed learning fish anatomy and being able to appreciate the anatomical differences between species. Samples were submitted to the Aquatic Animal Health Laboratory at Michigan State University under the direction of Dr. Mohamed Faisal. To thank them for their participation and to compensate them for the loss of 60 fish, the aquaculture producers were paid $4 per fish for a total payment of $240 from MDARD.

Reception of the program by participating fish farmers was good. All participating farmers seemed pleased to have their fish tested to ensure they were not infected with VHS. Some farmers participated because they were effectively offered a reduced rate for public waters stocking certification testing (a biyearly requirement if fish are stocked in Michigan public waters), as the VHS testing component was free of charge. Several farmers commented that they believe their risk of fish disease is quite low due to biosecurity practices.

As a part of the grant, eight private veterinarians from the state of Michigan were trained in fish sample collection. After completing coursework online, they received hands-on training with MDARD at one of the participating fish farms. It was fun for me to be able to pass on everything I learned this summer to help in the training efforts.

While at MDARD, I had the opportunity to become involved with many different programs within the Animal Industry Division. I assisted with inspections of animal shelters, rendering facilities and vehicles, and livestock markets. For county fairs this summer, I organized and participated in avian influenza surveillance testing and assisted with drug detection at a harness race. I was able to attend a Michigan State Animal Response Team / American Red Cross disaster training, a Michigan Agriculture Commission meeting, and a Michigan Aquaculture Advisory meeting. I helped with developing foreign animal disease literature for veterinarians, and I updated information on swine ranches and Scrapie protocols for sheep and goats. I also had the opportunity to assist with a drug residue investigation in cattle.

This summer was a great experience for me, and I would like to thank the following people: Drs. Michele Schalow, Peggy Roth, Susi Baer, and Wendy Osman for teaching me all about the aquaculture industry and giving me the opportunity to learn from you in the office and in the field, and making sure I got to participate in many different experiences this summer!
The Food Systems Fellowship Program creates opportunities for students to be involved in production animal medicine and their corresponding industries. This summer (2011), I was hired by the Michigan Department of Agriculture and Rural Development to assist the Animal Industry Division, predominantly the Bovine Tuberculosis (TB) Program. The program promotes the health of the cattle industry by performing regular testing, monitoring markets, tracking individual animals, and establishing proactive plans, like the Wildlife Risk Mitigation Project.

My goal for the summer of 2011 was to contact and survey producers in the “TB-Affected Zones” that were Wildlife Risk Verified in 2010. The goal of verifying farms is to eliminate contact between the cattle and wild white tail deer, which are hosts for the *Mycobacterium bovis* strain. To accomplish this goal, and proactively prevent transmission of disease, each individual farm is assessed by a state employee to implement appropriate alterations to the property. Changes may include fencing, blocking off open water that both species have access to, building hoop houses for haylage, etcetera.

I was given 311 producers to contact and gather feedback on their mitigation action plan. After calling each producer at a minimum of 4 times, I was successful with contacting 207 producers. Each producer was asked 15 questions about working with state employees, their action plans, or improvement suggestions they hoped to see develop in the TB Program. The participants’ responses were compiled with the previous year’s feedback collected by Ashley Kala. Overall, trends were relatively similar and attitudes toward the project varied regionally among counties.

Although my position was based in Lansing, I had the opportunity to travel north to Atlanta, Michigan, where an MDA office is stationed primarily for the Bovine TB Program. Wildlife in the northeastern part of the lower peninsula are found to be significantly more contaminated with the bovine strain of TB than any other part of the state, and therefore, cattle in this region are most susceptible. The “Atlanta office,” as it is so often referred, was created solely for the TB eradication project and to serve as a closer contact for the affected farms in the surrounding area. While visiting their office and some surrounding premises for a week in July, I was able to work closely with the employees to straighten out discrepancies between their updated files and Lansing’s database. While making phone calls throughout the summer, various numbers were wrong, which made it difficult to contact any of these producers. However, between both Atlanta’s and Lansing’s contact information, adequate changes could be saved in USAHerds. USAHerds is an online database that tracks all animals in the state of
Michigan by their RFID tags, their premise, their owner, dates they visited the livestock market, if they are TB tested, if the premise is Wildlife Risk Mitigated, and much more.

My summer did not only consist of office work and phone calls. Dr. James Averill and Dr. Rick Smith were very adamant about letting their interns experience state meetings, USDA meetings, TB testing with the State veterinarians, attending livestock markets, and even to partake in necropsies at DCPAH from infected herds. The entire summer was a wonderful experience and a very well rounded approach to the dairy industry in Michigan. It gave me insight to all the restrictions and regulations Northeastern Michigan farmers are experiencing while trying to raise and sell cattle. The cattle industry has proved to be a challenging one in Michigan due to the presence of bovine TB and those difficulties were reflected upon in the WRM satisfaction survey. The MDA is hopeful to continue working with producers in a more positive light and create an optimistic outlook for future producers in Northeastern Michigan.

Elise Meijers
CVM Class of 2013
Pfizer Animal Health

This summer I had the opportunity to work at Pfizer. Pfizer is the largest pharmaceutical company in the world. In Michigan, there are two Pfizer sites; one is located in downtown Kalamazoo and the other in Richland. I worked at the Richland Farm where I had the opportunity to work with cattle, sheep, and pigs. I worked primarily in the biocontainment building. I helped with many research studies from challenge to necropsy. One of my duties involved daily husbandry of the animals. This included general care such as cleaning, watering, feeding and general health observations. I often helped with sample collection, phlebotomy of pigs and cows, and intramuscular injections. During necropsy I helped scribe and collect samples. Other activities I did while at the farm was caring for calves and milking cows. One of the most valuable experiences this summer was being able to work with pigs. I had no experience with pigs prior to working at Pfizer. I learned how to handle pigs and learned what normal behavior looks like. One other thing that I took from this experience is an understanding of the amount of work that goes into research. I never imagined all of the planning and money that goes into one study.

While almost all of my time was spent on the farm there were also some off-site activities. One of the field trips was to Fair Oaks Dairy. Another trip that I was able to go on twice was screening calves for research at an Amish farm. As part of my internship I was required to give a poster and PowerPoint presentation to Pfizer colleagues. Overall this was one of the best experiences I have been able to have thus far. I learned so much and feel much more confident about working with both cattle and pigs. I was also exposed to research which is something that before now, I never considered as a career option.
As part of the Food Systems Fellowship Summer 2011, six students experienced veterinary medicine in another part of the world; Chennai, India. The students spent seven weeks in India conducting surveillance research on Tuberculosis, BVD and Brucellosis. We also contributed to the GRAND nutrition project, which utilized a feed supplement to help improve milk yield in village dairy cattle. We spent a great deal of time both in the laboratory and in the Madras Veterinary Clinic, interacting with clients, veterinary students and professors. To supplement our laboratory research we frequently traveled around the state of Tamil Nadu visiting villages, university farms and field stations associated with TANUVAS University.

Conducting field and laboratory research was an experience in itself and many times a struggle. We learned pretty quickly that we needed to be adaptable in achieving our goals for the projects. With limited resources things did not always go as planned. Often while we were conducting our field research for the GRAND nutrition project, we worked late and visited farms with limited electricity. This required us to be creative in the way that we collected our samples but also allowed us to gain confidence in our abilities.

Perhaps one of the most difficult obstacles that we dealt with in India was the language barrier. Sometimes, no matter how we phrased our intentions, it was impossible to get our point across and not because Indians didn’t understand English, in fact exactly the
opposite, they understood English too well and took our phrases in a literal sense. This made for very funny/entertaining moments, but also could be frustrating because we would have to make more of an effort explaining ourselves than we were used to in order to convey our ideas. Through our frequent interactions we learned to become much more patient.

One of the ways that we attempted to overcome the language barrier was by learning Tamil, only one of the many languages of India. Southern Indians are extremely proud of their heritage and a component of that is their language. Even though our pronunciation was shameful at times, they still were so happy that we made an effort to learn their language and be a part of their culture. Many times we hear a language that we don’t know and someone is trying to speak to us in that language, we panic because we don’t understand. After we learned a few words and grew more accustomed to the local body language, we could easily understand almost everyone who spoke with us. Both Indian and American culture benefit so much from effective communication between each other and making efforts to take time and really understand each other is so important especially when networking is a crucial component to the profession of veterinary medicine.

Being immersed in a third world country made us realize the importance of proper utilization of available resources. You quickly become grateful for the safeguards and technologies that the United States has in place to keep our livestock wholesome and healthy. But we can also appreciate the ingenuity of Indian agriculture and its ability to work within its limitations to achieve similar goals. It is expected that population growth in India will continue for the foreseeable future and agriculture will play a bigger role in feeding Indians and their animals and proper utilization of these resources will become increasingly important.

There are many differences between the dairy industries of the United States and India, but they both have the same goal in mind – produce milk for human consumption. Dairy farms in India mainly are composed of 1 – 3 milking animals in which this is the farmers’ sole income. The main breeds of cows milked are Jersey crosses, Holstein crosses, and Murrah water buffalo. Even though the water buffalo produce less milk, they are known for their high butterfat percentage reaching up to 9%! Harvesting of the milk is done by hand instead of a machine, and all calves are left on the dam for 6 weeks and then are weaned. For each of the villages, they have a milk collection center in which the farmers bring their milk to be weighed and sent off. Water is not supplied ad libitum like
it is in the United States due to many restraints; however they do offer them the chance to drink four times per day.

Comparison of Dairy Industry between United States and India

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<th>India</th>
<th>United States</th>
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<tr>
<td>Average Milk Production</td>
<td>12 – 21 lbs (6 – 10 L)</td>
<td>&gt; 75 lbs</td>
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<tr>
<td>Average SCC</td>
<td>2,250,000 cells/ml</td>
<td>228,000 cells/ml</td>
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<tr>
<td>Milk Price</td>
<td>$15.00 /cwt @ 15 rupees/L</td>
<td>$21.00/cwt</td>
</tr>
<tr>
<td>Average Calving Interval</td>
<td>24 months</td>
<td>12 – 14 months</td>
</tr>
<tr>
<td>Average Lifespan</td>
<td>14+ years</td>
<td>4 years</td>
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Unlike in the US, Brucellosis infections among cattle, other food animals and humans are common and cause many animals to abort or become infertile. Brucellosis also poses a significant public health risk so we felt that determining the antibody prevalence of the disease in both organized and unorganized farms would be very important. The organized farms we looked at were the research farms that maintained herd records and the unorganized farms were the groups of farmers within the various villages we visited. Madras Veterinary College researchers had already begun collecting blood and milk samples from animals which entered the clinic and employed the Milk Ring test, Rose Bengal test and Standard Tube Agglutination test to determine antibody prevalence. The ELISA was considered the gold standard test, but due to unforeseen circumstances we were unable to use that test in our study.

Our other disease project focused on bovine viral diarrhea virus (BVDV). The prevalence of BVDV antibody positive animals in Tamil Nadu was unknown and viral antigen had never been isolated from either persistently or transiently infected animals before our study. The extent to which the virus had affected the Indian cattle industry was unknown. We sought to determine the prevalence of antibody positive animals using IDEXX ELISA plates and test antibody negative animals for viral antigen using the IDEXX SNAP tests. Although we were unable to find any animals which tested positive for viral antigen, we were able to determine that 17.6% of the population tested (236 samples) was positive for BVDV antibodies.

In order to determine the prevalence of antibody positive animals for both Brucellosis and BVDV, our group collected samples from a variety of sources including the Madras Veterinary Teaching Hospital, Pinjrapole Cattle Shelter, villages around Tamil Nadu (unorganized farms) and university farms (organized farms). The cattle shelter proved to be the most challenging, as this center (nested in the center of bustling Chennai) was packed to the brim with over 3,000 unrestrained bovines. When Chennai started to urbanize, many farmers could no longer keep their cattle and these animals would be released into the streets where they caused traffic jams. To address this problem, the city created Pinjrapole, a giant cattle shelter funded by the Janeists (a religious group).
With the help of both TANUVAS and MSU faculty, our group learned how to properly restrain water buffalo and cattle and draw blood samples from the jugular vein. Milk samples were also taken whenever possible. Over the course of the six weeks, we obtained a huge amount of hands-on experience and were able to work side by side with Indian veterinary students. By working in the large animal clinic, we were exposed to many cases which we would rarely or never see in the US, such as anaplasmosis in cattle and rumen impactions. We were also given the opportunity to run diagnostic tests on the samples in the Madras Veterinary College labs and gained a great appreciation for the amount of time and effort it takes to conduct these tests. This experience was eye opening for many of us. In India, we found that many of the labs did not match the standards that we were used to when it came to sterile technique and we were forced to “go with the flow” in many situations. Due to the large human population of Tamil Nadu, power outages are common during the summer since many homes use air conditioning. The electricity would frequently go out in the labs while we were working which forced us to halt what we were doing or work in the heat. Although collecting samples and running the tests was frustrating at times, we learned patience, how to think on our feet, improvise and were truly able to compare and contrast the laboratory and field techniques of India and the United States.

One subset of our research work focused on a nutritional supplement for dairy cattle, compiled by a professor at TANUVAS and designed to target the rumen microbes to help increase digestibility to indirectly enhance milk production. With many of India’s dairy producers only owning one to several cows and keeping them as side projects rather than a primary means of income, Dr. Balakrishnan studied what many of the farmers of Tamil Nadu’s villages fed their cows and how much milk they collected, and in conjunction with mineral assays of the region created Gruel Rooted Additive Nourishment Drops, or GRUEL. Gruel, a watery byproduct of rice cooking, is fed by many rural Indians to their cows, providing minimal nutrition but some nonetheless, as part of a communal exchange activity, in which the gruel is received in return for dried cow patties, which are burned as fuel, to which the GRAND is added to provide nitrogen, copper and cobalt to the cow’s diet for the microbes.

In our time in Chennai working on this project, we were provided this back-story and also prepared many doses of GRAND to be distributed on trips to these villages so that we could observe their effect on milk production. We personally ventured out to three regions around the state of Tamil Nadu for this on two trips, about a month apart, for our research project. At each stop villagers with dairy cows were interviewed for the animal’s nutritional and medical history, done with the assistance of professors and local veterinarians for translation, and blood was drawn for potential mineral analysis, which we were able to directly participate in, and feed samples and milk records collected. Back at TANUVAS we analyzed the effect of different feed combinations with GRAND to observe the effects on the rumen microbe populations, and the milk record numbers, before and after GRAND use, were crunched to determine the effects on milk production. Although this work was lengthy and certainly demanding of patience on the field trips, considering long car rides between sites and interviewing farmers through translators, it was also a very rewarding experience. Thanks to Dr. Balakrishnan’s efforts and guidance the project was very organized and efficiently run, and the project proved a rewarding experience on several accounts: the project was successful in increasing milk production, and at a considerable level, so that our efforts directly benefitted the villagers, and the experience of going to the villages. At all of the villages, the residents were ready to interact with us, especially the children, who were keen to practice
whatever English they knew with us and learn a bit about us too. Just getting to see those villages was a great experience, so that we could understand that aspect of Indian demographics – a part not truly experienced by casual tourists. Besides the people, the regions we got to see were beautiful and fun to visit as well. Overall this nutrition work was interesting, personal and rewarding, getting to see immediate results for people we’d interacted with and knew would benefit from the effects of GRAND and our efforts.

Jeremy Shapero

Another part of time spent in India consisted of traveling to a University research farm called Kattupakkam. While there we assisted Dr. Faris Delil Yesuf in his tuberculosis study. We helped in gathering blood samples and administering the antigens for the comparative cervical test. Currently there is no protocol in place for animals that are found to be positive; therefore part of our aide in this project went toward setting up a protocol that could be followed under Indian conditions. We were able to work alongside some of the students and faculty while we practiced our wrangling and impromptu restraint methods on heifers, milking cows, and water buffalo.

After collecting the samples out on the farm Dr. Faris showed us how to do the gamma interferon test in the laboratory. One of our students was able to present information about the tuberculosis student at the National Clinical Case Conference that was hosted by Madras Veterinary College.

This project was one that we helped on later in our stay in India, and we really were able to help out and make the project our own because we were more comfortable with the customs and language. Even though we only knew how to say “water” and animals in Tamil we were still able to convey our ideas and suggestions through use of our body language and by example. There was one instance while we were on the farm that we had to wait for the animal caretakers to come and restrain the animals but we were on a tight schedule so we told the faculty to let us try and restrain the animals and we were very successful using the skills we had learned in our undergraduate Animal Sciences courses and adapting them to Indian conditions. I think the thing I will take away the most is to never give up trying to convey ideas you just have to adapt and adjust and if that does not work adapt and adjust again.

In addition to visiting many villages we were also able to experience more of the culture as we visited other areas of Tamil Nadu. We saw many temples in Trichy that were absolutely huge! It was even more fascinating to discover that these structures were usually carved from one giant piece of rock. The temples also house a Temple Elephant that would accept our offerings of money and the gifts from the people that were there to pray. During our visits to the temples, we learned so much about the Hindu culture and the Indian people in general. It was very refreshing to experience something so different from what we see in America.
Towards the end of our stay in India, we visited Mudumalai Elephant and Tiger Reserve. This was one of the coolest things we have ever done. The mountains in Mudumalai offered us a glorious reprieve from the heat of the city. We thought that the temperate rainforests would be quiet, but they were so full of diverse and loud wildlife. Still, we preferred the busy sounds of animals over the honking horns of the city! We went on safaris daily and saw spotted deer, Sambar deer, peacocks, bison and tons of wild elephants! Unfortunately, we didn’t see any of the big cats. We got to see the feeding and washing of the camp elephants. It was so amazing to see the relationship between a mahut (elephant handler) and his elephant. Towards the end of our stay in Mudumalai we got to ride an elephant for a morning trek! Words cannot describe the beauty of the park or the level of devotion the rangers and workers have for its inhabitants. It was truly an experience of a lifetime.

Our last adventure in India was a trip to the very tip of the country, Tuticorin. In Tuticorin, we saw where the sands of the Arabian Sea, Indian Ocean and the Bay of Bengal collided and formed beautiful shapes in the shore. We saw a sunrise and a sunset on the ocean and took a boat ride to an island to collect seashells thanks to the Fisheries College. Also on the shore was a Ghandi memorial that we were able to visit. This was yet another great insight to the Indian culture. After we toured the town for some time we traveled some distance to see a castle that was greatly influenced by the Chinese. The mostly wooden castle was very beautiful. On the way back to the city, we saw a gigantic bridge that connected the water sources of two villages and we also saw a waterfall that the people used for playing and bathing. These trips not only gave us a break from our lab work, but also allowed us to grow closer as a team and to truly experience the traditions of the Indian people.

FSF at the Lansing Lugnuts
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