

The MARE Center: British Equestrian Federation Internship – Zoe Greenwood



A sunrise at The MARE Center from our house

When I heard about the internship to go to the Middleburg Agriculture Research and Extension Center (MAREC) I thought it sounded incredible. I was a bit unsure about whether to apply at first because whilst it sounded incredible I thought I'd never be so lucky as to win it! In the end, after talking to my mum and my friend Michelle about it, I went for it and started writing my 3000-word report and so did Michelle. I picked my topic based on my Honours Research Project, I wrote about how the knowledge of equine internal parasites impacts the health and welfare of juvenile horses.

After submitting my report along with an application form I soon received an email informing me of my success in reaching the interview stage with Dr. Georgina Crossman, Jan Rogers and Professor Graham Suggett OBE along with Dr. Bridgett McIntosh, Extension Specialist at the MAREC, via Skype. I instantly got in touch with Michelle and she had been successful too, we were both really excited to be getting the opportunity to go to the BEF headquarters at Abbey Park as even getting to the interview stage of the process is a big achievement that could enhance your CV.

The first new experience that I gained with this internship was actually the interview process before myself and Michelle were even selected. I was nervous about the interviews but it turned out there was no need to be; Georgina, Jan and Graham were all extremely kind and welcoming. It was great hearing from Charlotte Woolley the previous winner of the internship as she explained what she had done on her internship which made me even more excited about the possibility of going myself. At the end of the day we were both thrilled as Professor Graham announced that we had both been selected to go! This was a first for the internship so we were both really appreciative and couldn't quite believe it. Since our interviews were at the end of March there was a bit of a rush to get everything organised for our trip, after a few hectic months and an exciting last minute trip to London we were on the plane to Washington Dulles airport heading to the MAREC.

The MARE Center is 420 acres of horse and cattle heaven, the huge pastures are a wonderful sight. The research focus at the center currently is equine nutrition and forages and their extension focuses are conservation practices and education via outreach programmes (Virginia Polytechnic Institute and State

University, 2016). It is situated in Middleburg, Virginia, this quiet town was the founder of fox hunting in the USA giving it the title of the 'Nation's Horse and Hunt Capital' (visitmiddleburgva.com, 2016). There are a handful of small shops on the main street of Middleburg including LouLou's, a beautiful accessory shop and Cuppa Giddyup, a tiny coffee shop. The most frequented place was the Red Horse Inn, a pub that sells great burgers and wraps. The area of Middleburg is beautiful, there are acres and acres of horse farms and winery's everywhere you look, the houses in the close vicinity are breathtaking, just 20 minutes away along Snickersville Turnpike there are some stunning country houses that are simply huge.



The main street of Middleburg

When we arrived at the MAREC we had a warm welcome from our downstairs neighbour for the summer and another welcome from the whole team including the 9 other interns the morning after during the Monday morning meeting. On our first evening we were invited by the interns to a bonfire where we roasted s'mores, this was our first chance to see the millions of fireflies that hang around the farm, this was an incredible sight although we quickly found out it's very difficult to take pictures of them!



Michelle clipping a plot for the BMP

We were very lucky to be involved in multiple research projects over the summer; there are currently two ongoing projects at the MAREC which we got involved in throughout the whole summer entitled the 'best management practices' (BMP) study and the 'turf grass' study.

The BMP study involved two pastures with 4 horses on each, one pasture was left with no management practices conducted and one pasture was divided into 4 grazing lanes with an acclimation plot and a dry lot accessible to all lanes. The aim of this study was to use 10 random pre-grazing and post-grazing samples from the lanes on a monthly basis and a quarterly 40 sample in order to show how rotational grazing improves grass quality. I got to help with all aspects of this study including clipping grass, weighing pre-drying, weighing post-drying and then grinding the samples to be sent for analysis to find the nutrient content in the grass. This was an invaluable experience for me because it showed me how research projects are run and allowed me to use equipment I had never used before. Whilst I was helping with this project, the leader of the project Shayan Ghajar taught me to identify different grass and plant species which became an ongoing challenge over the summer. The other interns were making a forage book over the summer which involved collecting and pressing different plant species which are classed as

equine forage and accumulating them into a folder/book. One of the interns got over 40 different grass species in her book and was also a whizz at finding 4 leaf clovers!

The turf grass study was a PhD student's study from another university, she was looking at grazing preferences of 9 different types of grass using 4 horses at the MARE Center. The grasses were sewn into 9 separate plots within 4 grazing areas for the individual horses, this meant that 36 plots needed to have 3 random 1m² grass clippings taken once a month, and depending on the time of year would depend on whether the warm season or cool season grasses were used. So we helped with the clipping and sample weighing/recording over a two-day period each month, we then helped Shayan weigh the samples after they had been dried out at 80°C in an oven later the same month. The samples were then ground in order to test palatability, stability underfoot and sugar content.



Turf grass plots



Grass grinding machine

Being part of these two studies was a very useful experience because it showed me how long term projects are run and how problems can arise and be overcome, even at PhD level. The main problem we encountered with the turf grass project was the crabgrass spreading across all of the plots, since they were supposed to only have one species of grass per plot it was a huge issue as it out-competed the species that were supposed to be there. The crabgrass is a warm season species of grass that is commonly considered as a weed, it is an invasive species that is not native to the Virginia area of Middleburg. Another issue we had to take into consideration was the growth of clover; it took over every available patch of bare ground so we had to pull it out by hand in every plot before we could start taking the sample within the meter square quadrat. We got through this by making it into a competition to find four leaf clovers, it really taught me the value of team work as we were usually out sampling all day and after hours.



A four leaf clover

Being part of these projects has made me think more seriously about doing a Master's programme in the future because it seems much more accessible and doable now that I have been able to be a part of two and have found I am capable of that kind of work. If I were to apply for a Master's programme, having this experience would put me ahead of many other candidates because they would only be likely to have BSc experience, some of which don't involve any primary research making these projects even more valuable to me.

There were two other studies that we were able to help with as well, one was the beginnings of the resident MSc student's research project and one was a short term study that had already started by the time we got there looking at the effects of acetaminophen on horses.

The MSc project involved going to a horse show over 3 days; we had to get as many people as possible to bring their horse to our tent and have them weighed and measured in order to help develop a more accurate way for owners to know if their horses are at the correct weight and body shape than the current body condition scoring (BCS) system. It is going to be an adapted version of the human body mass index (BMI) known as the body condition index (BCI) as it incorporates weight, BCS, cresty neck score (CNS), height, heart girth, belly girth and length measurements to give an accurate representation of each individual horse. This was a great experience because we were always busy which was a lot of fun, I got to develop my BCS grading skills and learn about the CNS system and use it accurately on a variety of horses. We were allowed to handle the horses at the show so we got to have some hands on experience when measuring the horses and leading them onto the weighing scales. This gave me experience in a practical research project giving me a variety of experiences.



Myself and Michelle with intern Kate, grad student Katie and Dr. McIntosh at Culpepper show

The acetaminophen trial involved the use of the popular human painkiller in the US on horses, the trial was looking at the physical effects the drug has on the horse instead of whether it reduced pain. This was to compare it with phenylbutazone the commonly used NSAID for horses that is known to cause gastric ulcers and liver problems. This involved us working closely with Dr. Harold McKenzie and Dr. Melisa Mercer during gastroscopies before and after treatment and liver biopsies after treatment. We also got to watch Dr. Mercer take blood samples via catheters occasionally throughout the trial and watch the other interns give the drug to the 12 thoroughbred geldings involved, it was ground into powder and mixed with water and karo (corn syrup) so that it was a tasty liquid to be syringed directly into their mouths. We both helped with the preparation of the syringes which involved grinding the correct number of acetaminophen pills for each individual horse which had been calculated by weight. We also helped by carrying the syringes round to the other interns as they caught the horses because they started to anticipate the syringe and refused to be caught! Working with Dr. McKenzie and Mercer was a wonderful experience and would certainly be one that I would struggle to get in the UK because those chances are usually reserved for veterinary students or for people currently doing a Master's programme.



Dr McKenzie performing a liver biopsy

Another project started at the end of our internship which was going to be the PhD student's, we got to help with the pilot run of the blood tests which was good to see, we helped by preparing the test tubes (writing the horse number, date and time of sample on) and by keeping track of time for the people taking the blood samples. The samples were taken before and after an oral glucose dose, we helped keeping track of the timing of the oral sugar dosing because some of the bigger horses needed multiple syringes putting in their mouths which was proving difficult. We were also able to help by tidying up the empty syringes, whilst this may sound like a boring job it was essential to the smooth running of the dosing and the subsequent sampling and ensured the horses didn't try to eat any of the plastic lids or tubes! This was really interesting because they talked us through how to take a blood sample by pressing your thumb in the dip of the horse's neck to find the vein and then insert the needle part of the way in at a 45° angle. The horses were all really good about having the blood taken which just shows how used to their role as research horses they are. A couple of weeks later the blood samples got processed in the YSI blood analysis machine to test their blood glucose and blood lactose levels to detect insulin resistance. This didn't involve much human work but we got to help prepare the samples, first they were centrifuged and then we helped by pipetting the plasma part of the blood which was on top into two sample tubes with the correct horse number and sample time on it. Two were used so that one could be sent away to Virginia Tech's labs and one could stay at the MARE Center to be used in the YSI machine. I



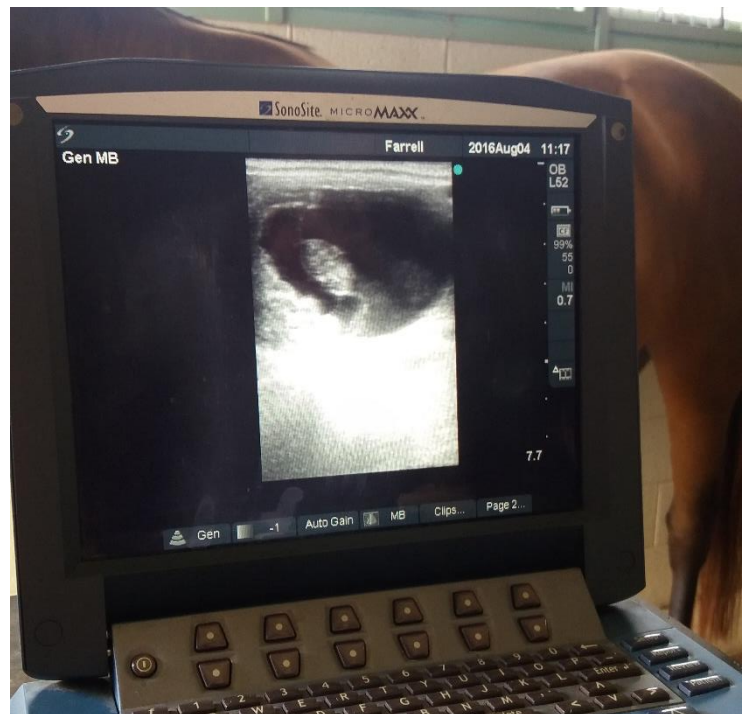
A blood sample after centrifugation

enjoyed helping with the preparation of the samples and was surprised with how straight forward it was (despite some machine errors!). I think this was a very valuable experience to have participated in because it is very difficult to come across this kind of experience in the UK unless you are doing a veterinary degree, and even then you may not handle blood samples as this is often done in labs.



Pipetting blood samples into tubes with Katie

We got a lot of opportunities to watch the MARE Center's dedicated veterinarian Dr. Katie Fitzgerald doing various things, but mainly doing reproduction related procedures. For example, there were four mares lined up to be bred when we arrived, two of which had given birth a couple of weeks previous to our arrival including the famous grand prix dressage mare Donna Classica (Don Larino x Novelle, Manstein) (Sporthorse-data, 2014), – affectionately named 'Nabou'. She had been bred to the famous Olympic Ferro who won team silver at the 1998 World Equestrian Games, 1999 European Championships and 2000 Olympic Games for the Dutch team. This meant I got to see the mares be ultrasounded to check their oestrus cycle status on a regular basis, help with lavages when Nabou got a uterine infection, watch four inseminations (two fresh and two frozen) and then see



A conceptus with a heartbeat

post-insemination ultrasounds. Nabou ended up conceiving twins meaning one needed to be terminated to allow successful carriage to term of one of the foetuses so I got to watch Dr. Fitzgerald 'pinch' one of the conceptuses. Watching the conceptuses grow and seeing a couple of heartbeats for the mares who were bred first was incredible, we were even able to see the shape of one the foetuses! I was also lucky enough to shadow her on multiple occasions and saw her interact with owners of horses that had different issues including uveitis and cellulitis; I also helped her with a lameness evaluation on one of her own horse by running it up and down for her. I also got to watch and help her horses be treated by an osteopath on multiple occasions which was

fascinating. Dr. Katie also gave me the opportunity to do faecal egg counts (FEC) on her own horses and on one of her clients horses, which involved doing about 30 FECs in one day (I had to enlist the help of Michelle on that one!). That also gave me the opportunity to teach the skill I had been perfecting for 9 months for my Honours Research Project, it was really interesting to see the difference in how the samples were taken (a lot less was taken than I was used to) and how the egg appearance was very similar to what I was used to at home. These were all incredible experiences that I am extremely grateful to have had because this is another thing that is usually only available to veterinary students in the UK, it will enhance my CV if I were to apply for a veterinary based Masters programme as the only experience I would have otherwise would be equine only, and even then it didn't involve much practical based experience.



Me helping Dr. Katie by doing electro-acupuncture on a yearling

Unfortunately, during our time at the MARE Center one of the older mares came down with colic. Dr. Katie came to assess her and we all spent the day monitoring her and changing the IV fluid bags which we got shown how to put up. She was sadly euthanised as the fluids weren't helping, however it was decided that a necropsy should be done to find the cause so this meant we got to watch a necropsy being performed which was really fascinating. Having learnt about the different types of colic and the structure of the equine digestive system it was easy to see that there was an impaction in the large colon which had caused the small intestine to fill with air and fluid as it couldn't get past the blockage. This large area of blockage and swelling had also caused the caecum to become displaced – Dr. Katie explained that this should have been the first thing we saw upon incision however it was really difficult to find. It is one thing to be told in theory how big the components of the digestive system are and a completely different thing to see it in person, it was something I always thought I would find hard to deal with however I learnt that I was able to put aside the thought of what it actually was in order to listen to Dr. Katie explaining what everything was and found it really incredible. Needless to say this doesn't happen on a regular basis anywhere so I feel really privileged to have been a part of such an amazing opportunity despite the unfortunate circumstances.

Aside from all of this veterinary experience, I gained a lot of practical knowledge; despite not being able to do it ourselves, we got to observe the other interns practicing foal handling. This was not only a new and interesting experience for me but it was also very funny to watch as the foals became more aware of things and started to figure the interns out, they became quite devious! As they got bigger they were trained to walk around using a 'butt rope' and headcollar – one end of the rope was attached to the headcollar then brought around under the foal's tail and held at the other side of the headcollar by an intern. This is so that they get used to the pressure of being led from under their chin but with encouragement of the rope pushing from behind to help control them – neither



Augustus being woken from a nap for training!

of them appreciated this! It was really fun to see them develop their own personalities, they really took after their mums and so were very different to each other. I also learnt how the graduate students dealt with running the yard and how they treated any injuries that arose, the main problem they had was 'scratches' which was the equivalent to mud fever in the UK. There were a lot of different options for treating the problem however it turned out to be quite difficult because the grass was always dewy in the mornings meaning the horses were always getting damp fetlocks since the grass was so long, this meant they had to be treated aggressively every day just to keep them under control. We both also got to help with the farrier when he came to trim some of the horses' feet, none of the horses were shod which was nice to see since most horses in the UK are shod. Since I don't have horses of my own I hadn't been able to see in detail how the farrier trimmed feet before so it was a new opportunity for me that I enjoyed.



Michelle, Katie (Right), Katie and I (Left) at the trailer during ISR inspections

We also went to multiple shows including the international sporthorse registry (ISR) Oldenburg inspections which were held at Zaragoza Acres in Jeffersonton. This was a really fun day because we took our mare 'Balencia' (Baladin Doc x Hearsay, Roemer) with her 6-week old foal 'Augustus VT' (Arrian x Balencia, Baladin Doc) to be inspected and registered as Oldenburgs. After a

long day and a well behaved Augustus, Balencia

was put into the marebook and Augustus received a really high score of 7.9, this included an impressive 8 for

movement and resulted in him getting branded. This was really good to watch as we all expected him to misbehave but he was really good and barely reacted to the hot iron.



Katie DeLano with Balencia and Katie Kauffman with Augustus at the ISR inspection

Another show we went to was the Virginia State 4-H horse show, this was a great 2-day trip that Michelle and I took with the two graduate students. We were assigned to help with the Cloverbud group for the two days; this involved doing arts and crafts with children of a young age and taking them around the show ring on the second day. Since we were in the auditorium above the indoor show ring we got to watch the events that were going on in there. This was a fun experience because there were some western shows going on including an in-hand show and the Tennessee Walking horse show, watching this was really good because we got to see the different gaits of the horses which looked really strange to us but was actually what the judges were looking for.



Michelle and I at the 4-H state show



On top of this, we got to go on an educational visit to Washington DC; we went to visit the American Feed Industry Association (AFIA) first where we were told about the current issues they are facing in terms of agricultural feed production. This was mainly a lot surrounding genetically modified (GM) food because a lot of people in America don't like buying GM products so this has meant that they've been trying to advertise it in a better light and educate people about what it really involves. Secondly we visited the American Horse Council (AHC), here we found out about what the AHC does and what they've been doing in terms of

All of the interns with Bridgett at Washington DC

equine legislation over the last year. They have recently dealt with a new piece of legislation involving the prevention of soring called the Prevent All Soring Tactics (PAST) Act. Soring is a practice used by owners of Tennessee Walking horses which involves the use of action devices, chemicals, pads, wedges and other devices to alter the gait of the horse by inducing pain (AHC, 2016). This is of course something that must be stopped as this is a really huge part of the equine industry in the US meaning there are a lot of horses being subjected to this cruelty. Last of all we went to the Russell Senate Office Building where we spoke to Senator Mark Warner's (secretary) where she also spoke a lot about the PAST Act and GM foods, this felt like a good last stop because it tied everything we had been told together by hearing how it gets passed through the Senator of the State. It was also really great to hear that the important people that can change things for the welfare of horses are doing what they can. Whilst we were in Washington we got to do a bit of sight-seeing as well which was really exciting.



All of us at the AFIA



The MARE Center held the '2nd Annual Spotlight on Stewardship: Equine Land Management Symposium' along with the National Sporting Library and Museum (NSLM) at the end of July (NSLM, 2016). This was a great event that I got to help with, all of the interns were enlisted to tidy and clean the yard, this involved a lot of scrubbing and sweeping! It was all worth it because it looked fantastic and everyone enjoyed having lunch in the 'Sales barn' which had been set up with tables and chairs. We helped the day run smoothly by ensuring the guests were taken to where they had to be at the right time. We also helped set up all of the stations including the BMP study and set up a tent for the guest speakers who would be talking about soil health and plant identification. There were lots of topics in the symposium in the form of either presentations or workshops including; pasture management, environmental stewardship, the toxicology of pasture plants for horses, plant identification, heavy use area design and construction, manure management, fencing,

Shayan Ghajar's talk about pasture management grazing management, and soil health. This was an interesting event because we got to listen to a lot of key scientists talking about their specialist subject including Dr. McIntosh's speech on environmental stewardship and Dr. Carrie Swanson's talk on pasture management. I learnt a lot and was fascinated by the different poisonous plants that grow in the USA compared to the UK such as Fall Panicum which has similar effects on horses as the common poisonous plant ragwort in the UK.

A lot of cleaning was done around the yard including all of the automatic water drinkers in the fields, the tack room, the barn and the clinic, this was to prepare for a visit by congresswoman Barbara Comstock. She came to listen to Bridgett talk about how horse farms are a key benefactor to the environment and for a tour of the farm including the clinic, she ended her tour by having a picture with Balencia and Augustus.

Amongst all of these incredible experiences I was able to collect faecal egg counts on some of the horses and advise the graduate student in charge about how to go about worming the horses for the fall. This involved going through the online herd health records and updating anything that needed adding from the paper record. By doing this I was able to tell them which anthelmintic they should use and helped to organise their stocks because they had a lot of out of date syringes, I also did a stock take on their vaccinations so they knew how much of each they needed to order from the vet. I also created a herd profile booklet which meant I got to spend a couple of days taking pictures of the horses which was really fun as they were all curious about the camera! The aim of the booklet was to help the staff which don't do feed run over the summer due to the interns being there know which horses were which when they were put onto the feed run schedule after all of the interns left. I enjoyed doing this little project as I know it will help a



Me doing a faecal egg count

lot in the future so that injuries can be reported quickly to the grad students and Dr. McIntosh without them having to come out to find out which horse it is.



Artemis posing for her page of the profile booklet

We were both also working on our Honours Research Projects until half way through August, the MARE Center staff were really great about this as they allowed us to spend as much time as we needed on them, there was plenty of desk space in the intern common room and the graduate student office which they were more than happy for us to use. They also let us have half of the day off so that we could do our voce viva's over skype which were necessary for the completion of our projects which we were both very appreciative of. We also did lots of fun activities including; visiting the NSLM- the paintings were incredible and you couldn't tell that some of them were even paintings they were so life-like, a hike through the Shenandoah national park on the Blue Ridge Mountain- the views were simply breath-taking it was something I will never forget and we also went to the state fair which was being held at The Meadow, the birthplace of Secretariat, this meant we got to look around the stable block where he was born!



Michelle and I at the NSLM



The beautiful Shenandoah Valley seen from the Blue Ridge mountain

It has been the best summer of my life and we are both really grateful for the opportunity to have been given such a fantastic experience, interning at the MARE Center is going to enhance our CV's and put us ahead of other candidates at job interviews or even when applying for Masters programmes, I can't encourage everyone enough to take opportunities like this that are presented to them because it can help you to grow in so many ways, the MARE Center has certainly done this for me!



The MAREC

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