British Equestrian Federation / Virginia Tech Internship 2014

Every year, the British Equestrian Federation (BEF) and the Virginia Polytechnic Institute and State University (Virginia Tech) hold a UK undergraduate competition for one place on an internship at the Middleburg Agricultural Research and Extension Center (MAREC) in the USA. The internship is three months long and the lucky winner gets involved in research, young stock handling and training, showing events, yard management and horse care.

'Barclay VT' (Baladin d'Oc x EM Wendi Q, Weltbekannt) and I

When I first heard about the BEF MAREC internship I was filled with excitement and knew I had to get involved. The application process involved writing a paper about an area of equine industry or welfare and completing an application form. I wrote a 3000 word paper entitled 'The welfare impact of equine obesity', which explored the reasons behind equine obesity and the techniques used to measure it, reviewed the welfare impact of various obesity-related conditions and suggested improvements that need to be made in order to improve welfare.

A few weeks after I sent in my application, I received an email which informed me that I had been selected to go for interviews at the BEF headquarters at Abbey Park, Warwickshire, with Karen Spinner, Professor Graham Suggett and Dr. Rebecca K. Splan, associate professor at the MAREC. After an adrenaline fuelled day, the announcements were made and I was absolutely delighted when I heard my name called out as the 2014 winner!

The MAREC is one of eleven extension centers owned by Virginia Tech, covering 420 acres of land. It is located in a remote area, about a mile and half away from the small town of Middleburg, in the heart of hunt-country and the beautiful Northern Virginian hills. When I arrived in the area, I was blown away by the striking beauty of the countryside and throughout my internship I spent a lot of my time exploring the natural beauty of Virginia.

The countryside around Middleburg

Middleburg is a historic and charming town and is widely regarded as the "Nation's Horse and Hunt Capital". It has a small population of around 670 people but is home to a large number of fine shops, cafes and restaurants (Town of Middleburg, 2014).

The area provides a luxurious habitat for a wide range of wildlife, where deer roam freely through the fields, bald eagles soar the skies, raccoons mischievously play and snakes slither through the long grass.

The MAREC

For over 20 years, the MAREC has played a part in the publication of a host of influential equine research and has provided excellent research facilities. Today, the MAREC continues to produce research in pasture-based nutrition genetics, immunology, reproduction and behaviour and also provides an educational experience for students (Virginia Polytechnic Institute and State University, 2014).

Sunrise looking over the MAREC

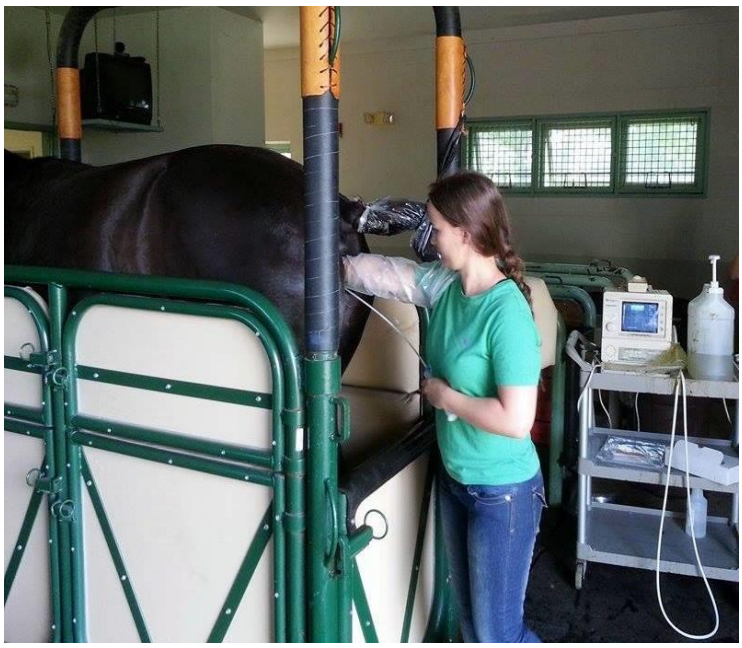
My BEF MAREC internship was primarily based around practical experience with the horses under the supervision of Dr. Splan and James Rayner, a previous BEF MAREC internship winner and current Equine Science MSc student. This involved regular shifts working with the horses, the frequency and duration of which varied considerably depending on what was happening at the farm at the current time. For the majority of the internship, I worked alongside 5 other interns and James. In addition to day shifts, we performed night checks when horses were kept in and had handling classes on some evenings.

During the shifts, the main tasks of the interns were to feed and check the general well-being of the horses, to keep all the horses looking smart and well groomed and to ensure their living environment was clean and safe. The interns regularly brought in horses for reproduction work and witnessed trans-rectal ultrasound scans being performed, which were used to monitor the mares' reproductive cycles. We also gave oral medications to some horses, cleaned and administered appropriate treatments to horses' wounds and helped with the farrier and vet when necessary.

Additionally, I was involved in the parasitic management of horses, which included collecting faecal samples from all the horses on the farm and then analysing the samples under a microscope to obtain a faecal egg count. The faecal egg count indicated the estimated parasite burden of the horses, which were then treated with anthelmintic drugs (aka wormers). Later in the summer, I also had the opportunity to handle the horses whilst they were vaccinated.

One of the main highlights of the internship for me was the experience of artificially inseminating a mare under the guidance of Robert Jacobs, a PhD student at Virginia Tech, who visited the MAREC for a short period during my internship. In recent years, the use of cooled and cryopreserved stallion semen in artificial insemination (AI) has greatly increased. Advantages such as international transportation (Bedford– Guause, 2007) and long term storage of cryopreserved semen has made it a useful tool in the equine breeding industry (Barbacini, 2013).

After learning about the theory of how artificial insemination is performed for almost 3 years during my degree, I had never actually seen it practiced. The process was much simpler and quicker than I had imagined. I carefully watched Robert perform the procedure on a mare and then it was my turn. After ensuring that the mare was in oestrus and ready to be bred, she was prepared for insemination and the pipettes were equipped with semen from the chosen stallion. The mare's perineum was thoroughly sterilised and I equipped myself with a sterilised glove and lubrication before carefully guiding the pipette through the mare's cervix into her uterus. It was a very exciting experience and one that I will never forget.



My first attempt at artificial insemination

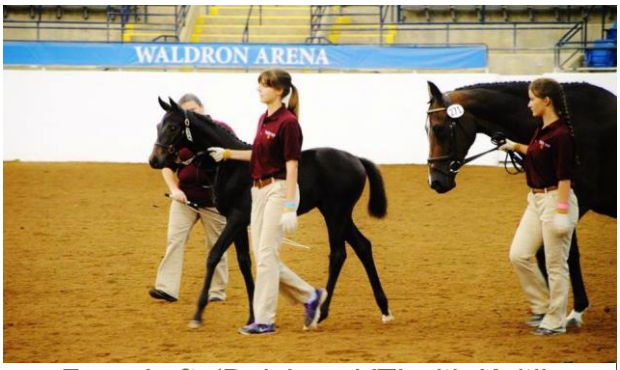
When I arrived at the MAREC, the seven foals that had been expected had already been born and were growing rapidly. During the internship, the interns were involved in various aspects of training and handling the young stock, including the foals, yearlings and two year olds. Part of the handling process was preparing for the annual international 'Dressage at Lexington' competition, which is one of the biggest horse shows of its type in the States. Prior to this, I had very little experience at showing horses 'in-hand', so handling the horses for American sports horse showing was quite challenging but very rewarding at the same time.

During our handling training sessions, we would practice various aspects of handling the horses and then perform as if we were competing. After this, we discussed how we felt the horse went and received feedback on how we performed and things we needed to work on.

Me standing up 'Nabou'
(Don Larino x Manstein, Luxus)

In preparation for attendance at 'Dressage at Lexington' we were involved in the preparation of the horses for the show. The interns were present when the mares and foals were clipped and the day before the show we bathed the horses, packed and got ourselves fully prepared. The journey up to Lexington was beautiful and I got the chance to see a little more of Virginia as we travelled south into a more mountainous region.

On the day of the show, we turned the horses out to show standard, which included thorough grooming and plaiting manes. In the classes, I had been given the role of 'mare handler' and was privileged to be able to work with 'Dom Perignon' (Domingo x Closet Dancer xx, Noble Dancer xx), aka 'Peri', whilst her beautiful filly 'Dulcinea VT' (Doctor Wendell MF x Dom Perignon, Domingo) was shown by one of the other interns. Also part of the Virginia Tech party were 'Obey' (Nepal x Mongo, Calamide) aka 'Gigi' and her filly 'Replica VT' (Rienzi x Obey xx, Nepal xx).



From Left: 'Dulcinea VT' with Kaitlin Dickson and 'Peri' with myself

It was a good day for Virginia Tech and we delighted when 'Dulcinea VT' was placed third and 'Replica VT' was placed fourth in 'Filly of the Year', during the breed show section of the event.

The six summer interns of MAREC with 'Peri', 'Dulcinea VT', 'Gigi' and 'Replica VT'

Showing at Lexington was an amazing experience and the atmosphere was incredible. It was also a great opportunity to watch some of the professional sports horse handlers and it really opened my eyes to a whole different side of the industry that I have never seen before. On the next day of the show I had the opportunity to watch some of the dressage and young horse classes, which were really informative because we heard the judge's comments about the horses. In the afternoon we set off back from a fantastic weekend and I felt like I had never done and learnt so much in such a short space of time!

One of many pieces of equine art at the NSLM

During my time as a MAREC intern, I got the opportunity to attend a few lectures at the National Sporting Library and Museum (NSLM) in Middleburg, which holds one of the largest collections of historic equine literature and art in the world. The NSLM is a research center, attracts scientists and scholars from around the world and regularly hosts educational events and lectures by equine experts (NSLM, 2014). All of the interns were given a tour of the library and museum and we were allowed to visit as often as we liked, which was a great opportunity to access a huge range of otherwise unobtainable information.

When I heard that we were going to have the privilege of meeting Dr. Andrew McLean in person at the MAREC and also attending one of his lectures at the NSLM, I was very excited. Dr. McLean is a scientist who I have admired for several years and I have used many of his training methods with my own horses. Dr. McLean has competed at national events in Federation Equestre Internationale (FEI) level dressage and eventing and jumped at Grand Prix level. He has performed ground breaking research in the field of equine learning theory and equitation science and has also been involved in improving the welfare of elephants during breaking and training in India. His training methods are based on the scientific principles of classical and operant conditioning and are popular around the world (McGreevy and McLean, 2010).

All six summer interns with Dr. McLean (centre) and James Rayner (far right)

Dr. McLean's lecture at the museum almost brought me to tears due to the amazing work he has done with elephant training. He was very down to earth and incredibly inspiring and really made me think about my own career choices.

We also attended a lecture at the NSLM by Dr. Kent Allen who is a very well respected lameness veterinarian in the USA and has been the vet for the American Olympic team. I had the opportunity to attend his lecture which discussed hind suspensory injuries and the common problems associated with the equine back. He was a great speaker and very informative. It was also interesting for me to hear the opinions of an American equine lameness specialist in comparison to British vets, because their information sometimes differs due to locational factors.

On another occasion, we attended an innovative lecture by Dr. Amy Burke, an equine nutrition specialist. The lecture was particularly interesting as she used recycled rubbish to demonstrate the scale and volume of the equine gastrointestinal tract (e.g she used a petrol can to demonstrate the volume of the stomach). Her teaching style allowed me to put into perspective a lot of the theory about equine digestive anatomy that I had learnt during my degree.

As part of our summer internship, all of the interns went on an educational visit to Hilltop Farm Sporthorse Centre Colora, Maryland, which is owned by Jane MacElree. Hilltop Farm is one of the leading dressage studs in the country and produces elite horses on a regular basis.

The American Hanoverian Society inspection and futurity was taking place at Hilltop on the day when we attended, which was a completely new experience for me. At sport horse inspections of this kind, horses are evaluated and scored on various factors including confirmation, temperament, correctness of gait, movement, free jumping ability and performance when ridden. It was an educational experience to watch the horses shown by professional handlers hear some of the judges' comments about the horses and was very interesting.

The stallion 'Sporano' (Sandro Hit x Contender, Tin Rocco) during his inspection

After the inspection was complete, we toured the farm and were able to observe some of the fantastic breeding management facilities that are used at Hilltop. We also were able to meet the horses within their excellent breeding programme and some of the internationally recognised stallions who are residential to Hilltop, including Contucci (Caprimond x Lungau, Akzent II), Don Principe (Donnerhall x Prince Thatch xx, Duerkheim) and Qredit (Quaterback x Dream of Glory, Rubinstein I), to name a few.

The cross country phase of the WEG preparatory trials

One weekend over the summer, I was able to attend the World Equestrian Games (WEG) Preparatory Trials for the American and Canadian equestrian teams, which were based a few miles down the road from the MAREC at the Great Meadow equestrian facility in a local town called the Plains, Virginia. The event included the typical dressage, show jumping and cross-country sections you would expect, which were spread across the course of two days.

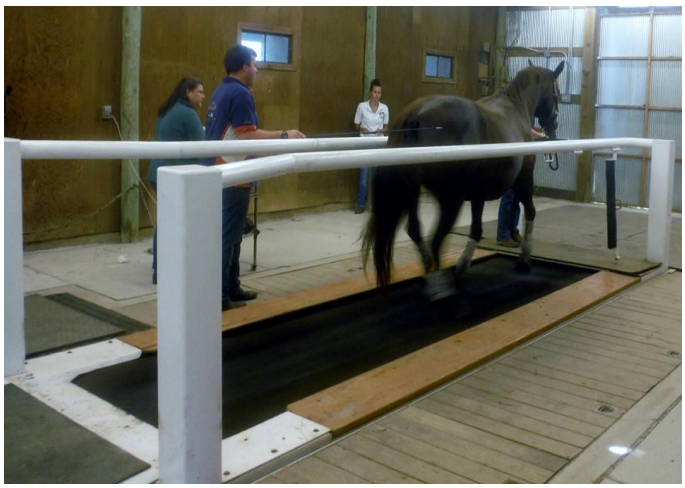
It was a great experience to be able to watch riders and their horses of such a high calibre (many of the riders and horses were in or had been in the USA or Canadian Olympic teams) perform at such an intimate event. We also took the chance to walk the cross-country course and really got the feel of what it takes to be a competitor at such a high-level professional event.

After the evening show jumping was held, there was a bareback puissance competition, which was very entertaining. The humourous event included a very impressive performance from a thirteen year old 14.2 hands high mustang pony, who cleared four foot six and was placed second despite some tough competition.

During my internship, the other interns and I had a lot of involvement with the 4-H youth development organisation, which has many links to land-grant based universities in the USA, such as Virginia Tech. 4-H is an after-school club and involves children and teenagers taking part in various activities in the local community. The four ‘H’s stand for head, heart, hands and health and their 'pledge' reads as follows:

"I pledge my head to clearer thinking, My heart to greater loyalty, My hands to larger service, and my health to better living, for my club, my community, my country, and my world" (4-H, 2014)

On one occasion, a 4-H group visited the MAREC and James, the other interns and I organised several activities for the youths to participate in during the day, which included a tour of the farm and demonstration of our equine treadmill.



The equine treadmill at the MAREC

The equine treadmill is just one of the excellent state-of-the-art pieces of equipment at the MAREC. In the past, the treadmill has been used as part of exercise related equine research. I had studied the many uses and benefits if equine treadmills during my degree but had never seen equipment such as this before, so it was impressive to be able to watch it in action with horses that had already been de-sensitised to it.

The tour also involved taking the children to meet the two resident stallions at the MAREC; ‘Royal Appearance’ (Riverman x Eyreen II, Lord Calando) and ‘Innkeeper’ (Secretariat x Sue Babe, Mr. Prospector), who is the last living son of the famous racehorse ‘Secretariat’!

After the tour of the MAREC, Dr. Splan gave a short reproduction lecture to the 4-H group and we followed it up with a game of adapted equine reproduction 'Jeopardy', which is an American television quiz. For the younger children, the interns and James brought in the help of a very trustworthy mare called 'Hearsay' (Roemer x War Drums xx, Mister Gus xx) for an interactive basic anatomy lesson, which involved putting stickers on the relevant points of the horse.

The other interns and I then showcased some of the mares in hand inside the round pen, as we had learnt to do earlier in the summer. We chose to show an ex-racehorse, a mare bred for jumping and one bred for dressage, so that the children could see the differences in gait of horses bred for specific disciplines. The day was a huge success and was not only educational for the 4-H children but also for myself as an intern.

James and I teaching anatomy

I was also invited to volunteer at a 4-H childrens’ pony camp to teach about musculoskeletal equine anatomy with some of the other interns and James. We worked in a team of four and put together a ninety minute lesson, in which we all had a chance to teach the children individually.

This opportunity allowed me to have my first try at lecturing and I volunteered to write and give a lecture about the equine skeleton. I learnt that it is necessary to teach children in a different manner than adults and it made me think about the things I had learnt during my degree from a different point of view.

I had never presented anything to children before so I was slightly nervous on the day but I learned so much myself and gained a lot of confidence from the experience. This opportunity was definitely one of the highlights of the internship for me and allowed me to apply the knowledge that I had learnt at university.

My equine spine model

The 4-H children at pony camp with 4 of the MAREC students, including myself

Over the course of the summer, I was given an assignment to complete called the 'sire project'. The project involved choosing appropriate stallions to breed to ten particular mares at the MAREC under three different scenarios. The first scenario was to match each mare to the best possible match out of a choice of ten given stallions, the second scenario was to do the same thing but with a budget of $15,000 and the third scenario was to make the best possible match for each mare, assuming that money was no object and any stallion in the world could be chosen.

All of the interns presented and defended their individual research in a group setting, where we received feedback about the choices we had made. This assignment really helped me to understand the complexity of breeding and how it is not just as simple as wanting to make the best looking foal possible. Other factors that had to be considered during the project included:

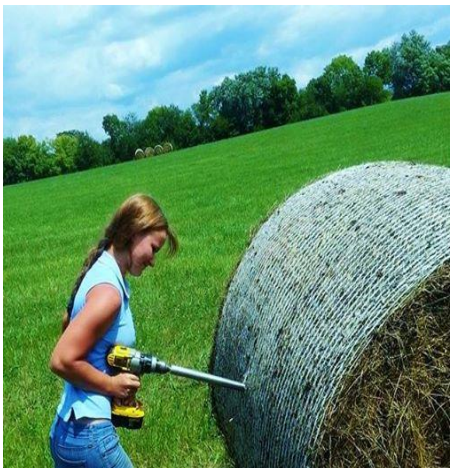
- Budget i.e. what is affordable and how can the most profit be made from the mares that are available?
- Marketability i.e. will the reputation of the mare and stallion encourage people to buy the foal?
- Fertility i.e. considering the breeding history of the mare and the type of semen that will be used, how likely is it that the mare will conceive?

- Genetics i.e. do the sire and dam share any related bloodlines and if so, is this likely to cause genetic problems for their offspring?
- Relevance i.e. will breeding this mare to this stallion produce a foal that will excel in a certain discipline?

Whilst I completed the research I needed for the project, I learnt a lot about the bloodlines of dressage horses and to a lesser degree racing, jumping and hunting horses. Bloodlines and specific genetics were two areas that I had very little knowledge about before my internship at the MAREC and I certainly feel that I am now more educated on these subjects.

During my internship, a new member of staff arrived at the MAREC, Dr. Bridgett McIntosh, who had previously been a Virginia Tech and MAREC student herself. Dr. McIntosh is an equine nutrition specialist, which is an area of research I am particularly interested in. Over the course of my internship, Dr. McIntosh gave us interactive equine nutrition lectures involving pasture walks and I was taught how to identify different varieties of grass and weeds. We were taught pasture management techniques and were able to discuss how management factors had affected the quality of various different pastures at the MAREC. We discussed several pasture associated nutritional issues and it was very interesting to learn the equine nutrition differences between the UK and this area of the USA.

Dr. McIntosh took James and I on a trip to a local farm where we were able to witness how an equine nutritionist evaluates the pasture and nutritional programme of horses within a specific case study. We were involved in problem solving on the premises and learnt how to apply theoretical principles of equine nutrition in a practical situation. I was also taught the procedure of collecting pasture samples, which involved ensuring a representative sample of grass species were taken from various locations throughout the specific field that was being tested. We also used a specialist drill to collect samples from hay bales, which were then sent for analysis to assess the nutritional value of the hay.



Me taking a hay sample!

We also spent a day collecting soil samples to be sent for analysis, which involved learning about soil types and how these soil types are mapped and evaluated on a premises. The soil samples were then sent to a local extension office where to be analysed for a variety of factors, including whether the pH of the soil needed adjusting and whether the Nitrogen, Phosphorus and Potassium content were appropriately balanced.

I also got the opportunity to learn how to drive an American tractor and was able to use farming equipment to top some of the pasture at the MAREC. These were all really valuable experiences and it was very interesting to experience equine nutrition management applied in this agricultural manner.

An American tractor driving experience

During the internship, I had the opportunity to assist with the photography and videoing of the young horses at the MAREC for advertisement purposes. Prior to beginning the process, Dr. Splan discussed with us what is required to obtain professional looking photographs and footage of young horses:

- The horse needs to be behaving and responding to the handler appropriately
- The horse must be in the best possible position so that it is shown at its full potential
- The horse handler needs to be out of the way of the picture
- The person getting the horse to look attentive and prick its ears needs to be efficient at their job and out of the way of the picture
- The lighting needs to be good
- The background needs to be neutral and not distracting
- The photographer needs to be in the right place
- The camera needs to be good quality and functioning correctly
- In the case of foals, the mare also needs to be behaving and out of the way, as does the mare handler

In order to get all of these factors to work, it required everyone to work together effectively and was a very good team building process. After our initial training, the interns worked together to produce some photographs ourselves and took turns to handle the foal, the mare, take photos and help the relevant horse look attentive, so everyone got a chance at each job. We were also involved in producing some videos of the young stock to showcase their movement, which was a great opportunity to be able to witness the high quality of the horses being produced by the breeding programme at the MAREC.

A picture taken by the interns of the beautiful 'Donata VT' (Don Hill x Berimba, Banter)

A few days after I arrived at the MAREC, I spent two days taking part in a research study which involved frequently sampled intravenous glucose tolerance tests (FSIGT). FSIGTs are used to assess insulin resistance in horses and were part of a study that assessed the effects of a nutritional supplement on insulin resistance in lean and obese horses. I was able to have experience handling the blood that had been collected from the horses and prepared it appropriately for lab work and also was able to experience the role of time-keeping during blood collection. Being present whilst the data collection was being performed was very important to me as I am interested in pursuing a research based career and was an experience that will no doubt be very useful to me in the future.

On several days during my internship, I worked in the laboratory alongside Dr. Splan and gained invaluable experience at various laboratory techniques. I learnt the correct technique for pipetting, had experience at handling blood samples, mixed various chemical solutions, learnt about appropriate laboratory hygiene and also was trained how to use certain pieces of laboratory equipment.

I was taught the method of several tests, including enzyme-linked immunosorbent assay (ELISA), colorimetric assay, blood glucose and blood lactate tests and was able to watch and assist as these were performed, which was very interesting. I was also

given the role of making mathematical calculations in order to obtain appropriate amounts of the substances needed in the tests. I was trained how to use the computer software, which was used along with a spectrophotometer to read the tests after they were performed.

Once the tests had been completed, I was taught how to understand the numbers that they produced and performed various statistical tests using computer software in order to interpret the data. I had learned about these tests during my degree and had also learnt various data analysis techniques, but having this experience allowed me to apply this knowledge and solidified what I had learnt at university. Being able to be involved in research performed right from initial data collection on a practical level, through lab work and then into data analysis was a great experience.

During my time around the area of Middleburg, I noticed that there were many different disciplines of equestrian sport that were popular, including dressage, show jumping, eventing, showing, hunting, show hunting, polo, Western and pleasure riding.

One weekend I got the opportunity to attend an American show hunter competition with Dr. McIntosh and her horse.
I was able to be her assistant groom for the day and it was a great experience to be able to witness the differences between hunter classes in the USA and the UK. I learnt a lot about the hunter discipline from this opportunity and also got the chance to network with several people who participate in the sport.

Dr. McIntosh and I with her horse 'Lincoln'

Dr. McIntosh also arranged for me to attend a twilight polo match at the Great Meadow equine facility, which was again a completely different side of the equine industry for me to experience and was a lot of fun!

During the last week of my internship, Dr. Splan organised a trip for me to go and visit the main Virginia Tech campus in the town of Blacksburg. The 4 hour drive South West to Blacksburg was beautiful and bypassed the Blue Ridge mountain range.

The beautiful Virginia Tech campus

I received a tour from a current college student of the various different animal sections and was able to discuss some of the equine reproduction research currently taking place at the university, including ground breaking stem cell research. After my tour, I met up with 2 previous MAREC interns that were now full-time vet students at Virginia Tech. The vet school was very impressive and had a wealth of educational information, which I found very informative.

I later attended an animal reproduction class taught by a post-graduate student entitled ‘Spermatogenesis and the Blood-Testis Barrier’. The class was divided into a lecture section followed immediately by a laboratory section. It was extremely interesting for me to be able to attend this lecture and compare it to my own lectures at my college in the United Kingdom. The subject matter was broken down into small sections and students were given support to understand the area examined.

After the class, I walked around the campus with one of the girls that I had interned with at the MAREC over summer and it is truly a beautiful place. Virginia Tech has a very 'busy' feel and seems to be a constant hive of activity, which is evident by their impressive research output and prestigious reputation.

Five of the other MAREC interns and I (far left)

I was able to explore the local area and had a lot of adventures in Virginia with the other interns during my internship. One of the highlights of my time in the USA was my visit to Washington D.C, which is a beautiful and also very educational city. I also

got the opportunity to attend the July the 4th celebrations in Washington D.C, which was an unforgettable experience. I visited the stunning Luray Caverns, went tubing on the Shenandoah River, visited the historic town of Harpers Ferry, saw a wild bear in the Shenandoah National Park, went to the local country fair and visited Oatlands historic house and gardens. After my internship had finished, I explored other areas of the States including Nashville, Tennessee and New York City. It was amazing to be able to experience the cultural differences between States and I had some of the best times of my life whilst exploring this beautiful country.

The interns and I after 'tubing'

The opportunity to be involved in equine research and visit leading equestrian events was an unforgettable experience. During the internship, I was able to put the theory I learnt during my degree into practice. This internship built on both my academic and practical skills and broadened my horizons in terms of my knowledge of the equine industry. I experienced equestrian disciplines and training methods that I had never encountered before. I can honestly say that the experience challenged me, helped my personal growth and changed my outlook on life. It was also one of the most beautiful areas of the world I had ever visited. It is safe to say that Virginia stole a little piece of my heart.

The beautiful Shenandoah National Park, Virginia

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