

Stuart Stevenson, 2013 AAALAC Fellowship Awardee

My Fellowship started on a Saturday afternoon in October, I hopped into the taxi and was whisked away to Heathrow Airport. I boarded my flight to Washington where I was met by a pre-arranged chauffeur, and delivered to my hotel safe and sound.

The hotel was excellently located, with a Metro station right next door, and Bethesda only a stone's throw away. Bethesda has worked hard to retain its village character and old world charm, while still being part of the hustle and bustle of Washington. Despite having all this on my doorstep, I soon retired to my room, as in the U.K. it was now about 2 am!

My first morning was free, great time to try and adjust to the time change, although I do not think this is as significant when travelling from east to west, the sky was blue, the sun was bright and so what should I do? Visit the zoo, which is only a couple of stops away on the metro, or, be a real tourist and head to the key attractions of Washington? I was keen to stay outside and get as much natural light as possible, so was soon off to Washington – on the metro it's only about 10 stops. I had a great day visiting the key sights; starting with the White House, then on to the Lincoln Memorial, Washington Memorial (under repair due to earthquake damage!), Capitol Building, and Union Station.

Then I returned to my hotel to stretch my legs in the pool and have a bit of a cycle!

At 7.30am on Monday I was collected by a government car and whisked off to the NIH only a few minutes away. I passed through security and was welcomed and introduced to the senior management team. I was given an overview of the site, its history and how in the early part of the 20th century, the site was left to the US by the Wilson family, successful clothing importers and retailers. Part of the conditions in the deeds for the land say it must be used for the construction of buildings for the National Institute of Health. Many major health institutes now have a presence here, and despite having a central facility, many of these Institutes still have their own animal facility.

Like in the U.K. financing is critical, and very carefully managed, to ensure best value is given to all the research teams and high standards of animal care are maintained.

Rodents are housed in Independently ventilated cages, in order to protect them from any pathogens in the environment, and the staff from allergens. I was quite surprised that the levels of PPE were lower than those I have become used to in the U.K., but it was explained to me that there is a careful balance maintained between what is

required to protect the animals, and cost. This has been developed through trial and experience.

The technicians looking after these animals also dipped their hands before handling the animals inside the cage to further reduce the risks of cross contamination. We also toured the cage wash area, a huge nerve centre for the whole facility which was noticeably not automated. Automation has been looked at and it was decided that this technology was not yet reliable enough to merit the investment required. Lunch was a huge spread of something I had never experienced before – Peruvian chicken, which turned out to be a culinary delight.

The afternoon was spent touring another facility on the campus which is doubling in size to accommodate their research requirements. Again they followed similar PPE and barrier rules which appeared to be working well for them. Here we also saw an automated bottle handling system which some people liked and some didn't.

Tuesday was a later start, with a pick up at 9am, and after getting me through security, I joined in the facility health and safety awareness induction for people working with larger animals, run by one of the facility attending veterinarians. This explained the additional health risks that can be associated with working with these animals why we have these in place and what to do if anything goes wrong! After this I moved on to the small animal health and safety induction which included a good discussion on health reporting in small laboratory species—how they ensure that the NVS and the PI are kept appraised. I was able to see an excellent and comprehensive form the facility has devised to ensure everything is recorded and available for future reference.

In the afternoon I had the pleasure of touring a facility housing Zebra Danios, The first room housed about 60 tanks on two racks. The second room housed about 60,000 tanks in four specific regions. The facility manager was able to explain how the large facility has progressively been segregated off from being one huge system, to four separate systems, hopefully to better manage any pathogens that may be present and enabling them to build in redundancy. If one filter system fails then they are able to open up a few valves and get one of the other filter systems to cover the requirements of two areas of the facility. All the pump systems had redundancy built in. One thing you really get the feel for in a system of this sort of size is the size of the filtration systems that are in the background. A comment of note from the manager was that they also need more fish to increase the load on the filters since this would make the filters more efficient. We also touched on how the maturation of the system has to be carefully managed when changing filter media so that the chemical constituents of the water remain correct.

Finally that day we were able to see the surgery and necropsy areas of the central building. The areas I was shown were easily comparable to those I have seen in human medical facilities and I would have no worry if I had to be taken into this area and undergo a procedure myself. The staff working in this area kept it so clean that everything looked new and unused, although I did see one surgery taking place and one necropsy!

Wednesday was a 9 am start. I was collected in the government car (little things please me but I thought it was so cool travelling in a car with “U.S. Government” on the number plates!). Today I was able to view a procedure taking place where the animal was given a white dot to look at, and then a shimmering image just below it. The animal had to keep its vision fixed on the white dot, and while doing so decide if the shimmering image moved towards the left or to the right, and once it had made this decision it had to look that way to get its reward. Sometimes the shimmering image did not move, and the animal would then make its decision on what it thought it saw in order to get a reward. This thought process was recorded by EEG, and then the scientist was looking at how the animal uses its brain in a decision process, and how when the animal thought it saw something, what was going on in its mind. This type of work has enabled the development of prosthetic limbs for amputees that are controlled by thought processes alone and could also be used to understand what happens in a delusional patient’s brain when they think they have seen or heard something that is not actually there. It could also help paralysis victims who need new ways of moving and controlling their limbs. We discussed how most animals learn this task quite easily, but between individuals there is a variance in how much of the reward they would like before they are fully sated—some go on until you stop them, but some will do the task until they are bored and then just do anything but that task and so return to their cages early. In each holding room it was lovely to see how the animals have a large central play pen which they get to spend time in each day. In these there are climbing devices, perches and nesting where forage can be discovered.

After this we transferred to the AAALAC offices, where I met my sponsors for the first time and all the AAALAC office staff who co-ordinate the site visits and follow-up actions as required. It’s amazing that with all the accredited facilities around the globe, they can achieve all this from this small nerve centre—a credit to everyone working there. We shared a lovely sandwich lunch, and then exchanged goodbyes and I was off to my afternoon appointment.

In the afternoon I was privileged to be given a guided tour of the National Aquarium in Baltimore, by Dr. Whitaker. We were able to see everything from the medical drawings that they sponsor, bringing new understanding to the public domain in an easy to understand and easy to distribute way. These included blood profiles of black tipped sharks and how the peripheral blood supply varied to the central blood supply. We were

able to see all the tanks from both the front, and often the bigger section was the view from behind! It was interesting to see how these tank filter systems were so similar to those we use in the research aquatic facilities, but they still run independent ones for each tank, to reduce the risk of cross contamination, especially as they always seem to have fish arriving and leaving, and need to be able to maintain this segregation. The coast seems to be the ideal location for a marine aquarium system, but in reality we were informed that the water quality in the Baltimore inner harbour was not high enough to use for a commercial or scientific application, so they take their own water and re-mineralise it to their requirements and use that.

That night the Priority One team took me out and ensured that I was sufficiently fed and watered at Fogo de Chou, a lovely Brazilian restaurant in Baltimore.

On Thursday I was collected early, and I was able to visit the NIH Offices for Animal Care and Use. I went along expecting this to be an overview of the IACUC (AWERB in the U.K.) function, but discovered that this is very much more than just an IACUC. It is very similar to our NC3R's in the U.K. and issues training guidance for NIH facilities, plus produces training material or guidance on where to find good material. This is made available on the internet, making it a global resource.

Next I visited the transgenic core production area, and we discussed how this facility sits 'in' the barrier of the facility, being the route for animals to get into the facility, and providing a micro-injection and transgenic production facility. The group is currently excited about a marmoset transgenic model which, if successful, would enhance the correlation of animal to human research. One large drawback of such a model is the generation time, meaning it takes a long time to progress these sorts of models into larger, usable colonies.

Thursday afternoon involved a transfer to the offsite primate facility, which I can only describe as a converted farm – it was huge. I was able to see the huge breeding pens which spanned 10's of acres, where macaques were bred, plus the facilities used for breeding other smaller primate species. The technicians looking after these animals kept the facility looking fantastic, considering it is a large rural setting, often involving large species in huge pens, but the animals all looked happy and content, with large pens to move around in, and with an option of being inside or outside, as they desired. It was really pleasing to witness the care and attention that goes into the welfare of these animals, and how this has been developed as our understanding of the animals has developed.

My final day was spent visiting the facility at Medimmune, not far from NIH. This facility was comparable to the facility I currently work in. We were given a great insight into how they are able to manage their protocols in a computer package which then ties in and

regulates their animal ordering system. We toured this facility and discussed the challenges around how it has expanded, while remaining operational. Also how they manage being a site that has GMP while also incorporating a scientific discovery facility too.

This was the end of my first week, and I was sad to be leaving all these great new colleagues behind. I had such a huge experience in many different animal facilities, and could see how we are all trying to achieve high standards of animal care in a prudent fiscal environment, and how each person involved in this process is so committed to achieving this.

On Saturday I transferred by a short car journey to Baltimore, “Charm City,” for the AAALAS conference, and was able to register for the conference. I did some sightseeing that day as well as buying those all important gifts for my family and colleagues I had left back home. On the Sunday I visited sites such as the great author Edgar Allen Poe’s grave, where you can also learn a lot about the establishment and success of Baltimore as a city from the exhibition around this historic site. I was able to see the U.S.S. Constellation and the Baltimore Science Centre. There was an orientation session for AALAS newcomers in the afternoon, and that evening was the AALAS opening ceremony. This was topped by an excellent presentation given by the renowned Population Geneticist Spencer Wells. As soon as you mention genetics most people shy away, but Spencer was able to describe his work in such a way he captivated the audience, sharing with us the unexpected success he has had in collecting human samples for his work, and plotting the geographical history of man.

The AALAS Conference is a huge experience, with the biggest trade hall I can imagine this industry will ever see—over 300 poster presentations, 30 workshops, over 80 platform sessions and numerous round table discussions, all packed in between Monday morning and Thursday lunchtime.

I went to some interesting lectures on:

- Environmental enrichment, which covered areas such as how design, colour and build material can all affect how an animal interacts with an object, and how long that interaction is for.
- The use of novel analgesics in laboratory species.
- Effects of sleep deprivation on a pregnant animals’ offspring (something we should all bear in mind whether this deprivation is intentional or accidental).
- The effects of anaesthetics on circadian rhythms of animals.
- New cage design concepts and their animal welfare benefits.

- How changes in practices in an animal facility can affect the behaviours of the animals in it.
- The causes and management of aggressive behaviours in laboratory animals.
- The application of the 3R's on a national and global basis.
- Laboratory animal behaviours, plus changing behaviours in ageing animals.

On the whole I really enjoyed the conference. Some of the papers quantify what animal technologists do on a day by day basis, so consolidate what we intuitively do, and it is nice to see these confirmed. Others really are more blue sky thinking, but one thing they all have in common is they are very thought provoking.

I had the honour of collecting my Fellowship Award on Wednesday lunchtime at an International luncheon provided by AAALAC, They were very hospitable, and looked after their guests from all around the globe. I was a bit nervous before collecting my award, but it all worked out smoothly. Finally a few thank-you's – to AAALAC for making me one of the honoured recipients of the Fellowship Award, thank you to Priority One who sponsor the award, and thank you to everyone involved in making my experience so memorable.