

Reports from 2011 Travelling Fellowship recipients

Lucie Brown

31st Annual International Sea Turtle Symposium, San Diego

I recently graduated from the University of Exeter, Cornwall, with a degree in conservation biology and ecology - inspired by my first encounter with an olive ridley sea turtle on a Mexican beach in 2006. At the time, I was working as a volunteer for Ecologistas de Nayarit, a small organisation based on Mexico's Pacific coast. Their focus is conserving olive ridley sea turtles along this stretch of coast, where the females come to lay their eggs during nesting season. Olive ridleys are classified as vulnerable in the IUCN Red List of Threatened Species 2011, because of overexploitation of turtle eggs, due to it being a local delicacy, and high rates of bycatch, when turtles are accidentally caught in fishing nets.



My experience as a volunteer introduced me to the magical and diverse world of sea turtle conservation, and I have now decided to follow a career preserving these reptiles. I hope to achieve this by expanding my knowledge and initiating my own research into areas that are fundamental for turtle conservation in the long-term.

Sea turtles in Mexico

Receiving the grant is one of my proudest achievements to date, and the money enabled me to travel to San Diego in April to attend the 31st Annual International Sea Turtle Symposium. This was a monumental step for me. Without the travel grant, I would not have been able to attend the symposium and present my research to the sea turtle conservation community.

My research focused on the effects of artificial incubation on olive ridley hatchling fitness. The method of sea turtle hatchery management used in the majority of projects across the globe is to relocate nests from the beach to safe areas known as hatcheries, where the eggs are reburied and guarded from poachers and predators. Once the eggs hatch, the baby turtles are released into the sea to begin their epic life journey.

Along the Pacific coast of Mexico, artificial incubation, which uses polystyrene boxes to incubate eggs, is becoming a common alternative. This is mainly because illegal poaching is common on nesting beaches and funds to protect the sites are lacking. My research aimed to assess the effects on hatchling fitness of this method.

I identified fundamental differences between hatchlings incubated in a hatchery, compared with those incubated artificially. Hatchlings incubated in boxes are not active immediately when they emerge from the nest. In contrast, those emerging from reburied nests enter what is described as "frenzy mode" almost immediately. This information is vital to hatchery managers as the behaviour of hatchlings at emergence determines the most appropriate time for them to be released.

My study was very well received at the symposium and I met some influential and experienced sea turtle biologists, whose support and advice was both inspirational and insightful. It was a pleasure to meet the pioneers in sea turtle conservation and the experience has fuelled my passion to continue working towards the conservation of this precious marine species. My heartfelt thanks go to the Society of Biology for the generous grant.

Peter Coals

Understanding the elephant shrews of northern Mozambique

It can seem that all we hear of the natural world is the destruction of wild places and the loss of species, and, unfortunately, this is the case in many countries. I have witnessed the plight of Mozambique's forests, and have seen illegal logging stations and freshly butchered bush-meat being confiscated from poachers.

During my time in the UK, undertaking a degree course by day and writing grant proposals by night, those forests began to feel increasingly distant. However a burning question kept the memories alive - was there an undescribed subspecies of giant elephant-shrew, or sengi, running around on the Mozambican forest floor, overturning leaf litter with its long nose in search of the insects that make up its diet?

Information on giant sengis (*Rhynchocyon*) in northern Mozambique is scarce, despite being home to the first species of giant sengi ever described. The chequered sengi (*Rhynchocyon cirnei*) was described by Wilhelm Peters in 1847. It is now recognised as one of six subspecies of *Rhynchocyon cirnei*, ranging from south of the Congo River to north of the Zambezi in Mozambique.

Descriptions of the six subspecies were published by Gordon Corbet and John Hanks in 1968. In their work a note, inconspicuously placed on a map annotation, suggests that they suspected an undescribed seventh *Rhynchocyon cirnei* subspecies existed in northern Mozambique.

Back in Mozambique, I sat with Dr Galen Rathbun, IUCN Afrotheria group chair and an expert on the sengi, in the blistering heat of the Mareja Community Reserve in the Quirimbas National Park, almost directly underneath the distribution point for that elusive seventh subspecies.

Catching giant sengis requires patience, as they are not attracted by bait and rarely use paths on the forest floor. We simply had to put down as many wire cage traps and gill nets as we could, in the hope that a sengi would stumble into one. Checking the traps at regular intervals kept us busy throughout the day. By night, I often found myself, under Galen's guidance, preparing museum specimens by the light of a head-lamp.



Peter examines a Chequered sengi

The forests of Mozambique are a far cry from the laboratory environment, and DNA analysis of our specimens back in Oxford is still awaiting completion. However, morphological comparisons with various taxonomic collections have been completed. These indicate that the seventh subspecies is unlikely to be valid - the giant sengis from northern Mozambique appear to be the same as those described from near the Zambezi by Peters all those years ago. So, unless the DNA proves us wrong, we did not discover a new subspecies and scientific immortality continues to evade me.

I am grateful to the Society of Biology for the travel grant that contributed to this work. I continue to work with local and international collaborators to preserve the north Mozambican coastal forest, united under a newly appointed (if already discovered) flagship species, whose survival is inextricably linked to these threatened forests - the chequered sengi.

Helga Groll
Neuroethology conference, USA

In 2008 I attended the Gordon Research Seminar (GRS) for neuroethology. This was a smaller conference meeting prior to the Gordon Research Conference, aimed at postgrads and postdocs and supervised by a few professors. Before the GRS we were invited to send in our thoughts and ideas for the topic of the meeting: Neuroethology in the year 2050. I sent them my ideas and, in course, was invited to give a talk. The meeting proved to be a great success and I was elected as a conference chair, to organise the next meeting in August 2011.

So, finally after three years, I flew to the Stonehill College, near Boston, for the conference. I had spent the year arranging a conference program, selecting and inviting speakers and writing funding. The entire experience was absolutely amazing!

The GRS itself was an absolute highlight. The principle of the GRS was to encourage communication and discussion of ideas and results in a smaller, informal setting. Often, younger scientists can be intimidated by the presence of senior scientists at conferences which can result in a failure to participate in open discussion - to the detriment of the science. The GRS is designed to build the confidence of the youngest scientists in a friendly environment prior to the main meeting, to the mutual benefit of both groups.



Helga presenting at the conference



All in all, I have learned a lot about writing funding applications and organising a conference. On top of that it gave me the opportunity to meet up with colleagues and mentors from my previous lab in France, and I met lots of new peers as well as potential future employers. The highlight was to hear the positive feedback of how people had enjoyed the conference. Post event I was still receiving emails from delegates saying it was the best conference they had been to in years. To see everything fall into place was the biggest success.

Seeking funding for the conference was tough. We managed to cover registration fees of the attendees and provide them with some travel support, but my flight costs were not covered. Without the fellowship I would not have been able to afford a flight ticket to Boston, to actually carry out my duties as a chair.

I would encourage students to apply for travel grants because every opportunity to visit another lab, a conference or conduct an internship is a great chance no one should miss.

Phil Tunstall
Volunteering with the Atlantic Whale Foundation, Sierra Leone

Sierra Leone is overwhelmingly beautiful. There is so much to see and experience - I would recommend anyone to visit. Thanks to the Travelling Fellowship I was able to spend a month of volunteering with the Atlantic Whale Foundation (AWF).

I was based in York, a small fishing village nestled within the mountainous rainforest which makes up the western peninsula. Close by was a stunning two mile long white beach. The surrounding wall of palm trees was studded with the hollowed-out, roofless, concrete shells of former hotels and restaurants. This was a constant reminder of the recent troubles, but also of the former prosperity of the area. Sierra Leone is slowly recovering from its long and brutal civil war but remains bottom of the human development index. Its people, although poor, are extremely warm, welcoming and good humoured. I made numerous good friends and felt embraced and relaxed there.



The civil war has caused a lack of infrastructure in the country and has also made tourists and scientists alike apprehensive about visiting. This means that much of the immense biodiversity is yet to be explored and is under threat due to illegal logging and the bushmeat trade. The AWF encourages its volunteers to work with the locals in community projects or conduct their own research. I spent my time teaching in schools about the benefits of protecting their forests. I think the only reasonable way of protecting these declining forests is through educating locals about the true value of the forest. This will in turn benefit wildlife conservation and bioscience in general.

I was interested but also concerned with the deep seeded belief in black magic held by the tribal villagers. It is widely accepted that strapping a chimpanzee bone to your back will make you as strong as five men and that virgin female sheep can become pregnant in a heavy thunderstorm. It is also customary to have small tattooed stripes on your arms and wrists to protect from snakebites. Fortunately I returned to England unbitten and tattoo-less!

I now begin my final year of an evolutionary biology degree at Exeter University with a slight change of direction and renewed academic drive. In Sierra Leone I was exposed to the harsh realities that poor people face living in a malaria zone. I have decided to focus my dissertation on the efforts towards the eradication of malaria and will pursue a postgraduate position in this field. I came to study biology just because I found it interesting, but my experience in Africa has given me a specific area of focus for the future.

I have the Society of Biology to thank for a fantastic and life changing experience and for focusing my scientific ambitions.

For details on the Atlantic Whale Foundation please go to www.whalnation.org

Alexandra Cole Field course in Madagascar

I was thrilled to find out I had received a place on a tropical biology association field course in Kirindy's dry deciduous forest, in Madagascar. As one of only 2 successful UK applicants I was eager to take advantage of the unique opportunity, not only to study in such a fascinating environment with so many endemic species, but also to use the practical skills I had learnt throughout my 3 year undergraduate zoology degree. During the course I encountered a wide range of learning opportunities, including lectures, classroom activities, field exercises and even an independent field project.



Eighteen participants from across Europe and Africa attend the course, led by lecturers from across the globe. Being able to work with academics and students from such varied countries enabled me to broaden my knowledge of biology around the world. Short talks given by each of the students on conservation in their own country enriched my understanding of the challenges faced in these countries and students were able to compare and contrast difficulties and success stories. We also assessed how methodology varies depending on the restrictions of particular countries and environments. As such, I was able to learn, not only from the lecturers, but also from the other students.

Alex radio tracking sifaka

Madagascar's dry deciduous forests are highly threatened and unfortunately Kirindy forest qualifies as one of these endangered environments. In previous years logging has taken place in Kirindy, threatening many of its species, including those which are endemic. Baobab trees are keystone mutualists of dry forests, providing important food sources for numerous animal species, yet little work has been carried out on the dispersal of their seeds. In an independent field project, which I carried out with a student from Mauritius, we aimed to determine the fate of the seed of the endemic baobab *Adansonia rubrostipa*. Observations over 9 days revealed an interaction between *Hypogeomys antimena*, *Macrotarsomys bastardi* and the experimental *A. rubrostipa* seeds. Such observations opened up questions regarding secondary dispersers and the distances over which the baobab seeds may be dispersed.

In just 4 weeks, I have learned such a lot and I am extremely grateful to the Society of Biology for providing the travelling fellowship which allowed me to take part in such an enriching course. My time in Madagascar has only fuelled my passion to learn more about conservation biology and the ways in which I can contribute to it - I am hopeful that this experience is the first of many.

James N Sleigh
Jackson Laboratory, USA

The nervous system fascinates me. It was difficult enough orchestrating 10,500 athletes, 70,000 volunteers, and all the millions of spectators at this year's Olympic Games in London; imagine how intricate and refined the process must be to coordinate the development of the over 100 billion nerve cells and in excess of 100 trillion synapses (the connections between those nerves) that comprise your nervous system.

The nerves boggle.

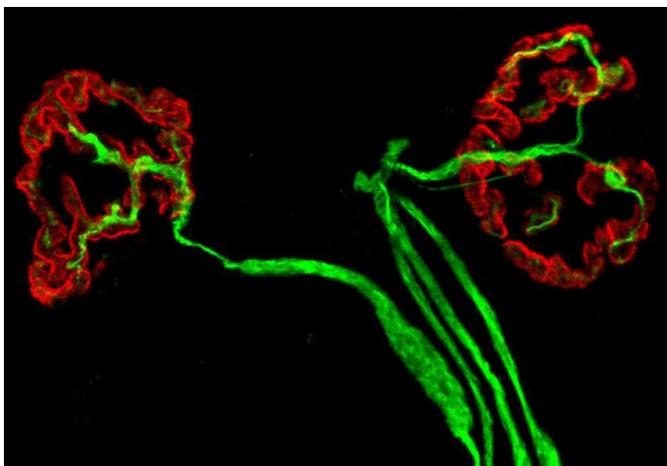
Given this complexity, it is perhaps unsurprising that things can go wrong. The World Health Organisation estimates that nervous system disorders account for approximately one third of all diseases in affluent nations. With this comes significant financial burden; the European Brain Council suggests that neuromuscular disorders cost approximately €30,000 per person every year. Research into nervous system disease is therefore essential.

I work on two incurable neuromuscular diseases, spinal muscular atrophy (SMA) and Charcot-Marie-Tooth disease type 2D (CMT2D), that affect the motor neurons, which are the nerve cells that link our brains and our muscles, allowing us to consciously move about. When these motor nerves degenerate and die, contact with muscle is lost, causing the muscles to atrophy (or wither).

Intriguingly, both conditions are caused by mutations in genes that express widely and constitutively active proteins with vital "housekeeping" functions required by all cells (*SMN1* in SMA and *GARS* in CMT2D). Hence, there is a conundrum of why the motor neurons should be specifically susceptible to the mutations.

With a fantastic team of scientists at my university and abroad, I have been trying to deduce the mechanism connecting dominant mutations in the *GARS* gene to motor neuron death in CMT2D. *GARS* encodes glycyl-tRNA synthetase, the canonical function of which is to charge the amino acid glycine to its cognate tRNA receptor priming it for protein translation. Alas, as is the case for a number of other neuromuscular disease genes, knowledge of its primary function does not provide any major clues as to the cause of the characteristic neuronal fragility seen when it is mutated.

Working with a mouse model that possesses a dominant mutation in the mouse *Gars* gene causing motor dysfunction similar to the human disease, I have been studying neuromuscular junctions (NMJs) to tease apart the disease pathogenic process. NMJs are regions between motor neurons and muscles that allow the passage of signals from the brain to muscles resulting in muscle contraction. We can dissect muscles, stain the nerves and neurotransmitter receptors, and see how the mutation affects the development and maintenance of this specialised synapse, which often shows early warning signs of nerve cell death (see figure for an example of NMJs).



An opportunity arose at the start of the year for me to travel to the US for four months to work with our collaborator on the project, Dr Robert Burgess at the Jackson Laboratory in Bar Harbor, Maine. Without the generous funding of the Society of Biology, I would have been unable to go to one of the world's premier mammalian genetics institutions and gain invaluable experience from a NMJ expert and his laboratory. The tips and tricks that I honed and new techniques I learnt will undoubtedly stand me in good stead, and for that I am extremely grateful to the Society.

Mouse neuromuscular junctions – nerves are stained in green and neurotransmitter receptors in red

Yvette van der Eijk
Hastings Center, USA

I am a PhD student at the National University of Singapore in Singapore, South-East Asia. My background was in biochemistry and cancer research, and I then moved into bioethics.

Bioethics is an emerging field, a cross-over of medicine, law and moral philosophy. It deals with the issues of how to ethically implement controversial technologies and medical practices into society. Key areas include topics such as euthanasia, organ donation, genetics, cloning, human-animal chimeras in medical research, stem cells, and neurological disease. My PhD study is about nicotine addiction. A key component of the work is about genetic tests for lung cancer and nicotine addiction and their potential impacts on society and healthcare.



Thanks to the Society of Biology, I had the opportunity to spend my summer at the Hastings Center in New York. The Hastings Center is a bioethics organisation that invites scholars from all over the world to interact with other bioethics researchers, share their ideas, and learn about their research in a North American context. They produce their own journals (IRB journal, and the Hastings Center Report) in order to share their ideas with other researchers from similar fields. The Center itself is in a very rural area, which allows visiting scholars to focus on their work and interact better with one another. The Center also has an extensive bioethics library, which grants the scholars access to volumes and books that are otherwise difficult to find.

During this time I was able to conjure many new ideas for my research and was given a lot of helpful advice for my thesis. I met researchers from many interesting fields, including politics, law, medicine, arts, science, history, and philosophy. I was able to share advice with them and gain lots of interesting information about my work within the North American context.

I was researching the connection between the genetics of nicotine addiction and the impact of this on lung cancers. Some genetic susceptibility alleles have been found with a weak to moderate association to nicotine addiction. However, their weak predictability factor means that genetic tests that promise to uncover susceptibility to addiction are unlikely to be helpful. There are already some problems with companies trying to market such tests directly to the consumer. The idea of genetics as a determinant of addiction susceptibility also raises sociological issues, such as the medicalization of a problem (i.e. smoking, lung cancer, nicotine addiction) that is largely social in nature, genetic determinism, and undermining of public health measures and power of the free will in smoking cessation.

My time at the Hastings Center was very useful for my research. I was able to explore the American culture and contrast it to the culture of Singapore, learn more about the local healthcare systems, and interact with many interesting scholars from diverse backgrounds. I thank the Society of Biology for granting me this travelling fellowship, and I will be sure to acknowledge their help in future publications.

Bradley Matthews
Ecosystem modelling placement, Stockholm

I spent two months in Stockholm on a work placement at the Department of Land and Water. The purpose of the placement was to develop skills in ecosystem modelling. My supervisor at the KTH, Professor Per-Erik Jansson is a leading scientist in the field of ecosystem modelling, and his process based ecosystem model, CoupModel, has been used by many research groups worldwide. The placement therefore provided an excellent platform to explore this very interesting scientific discipline and a great chance to apply the CoupModel to the research project I have been working on over the last couple of years.

Since 2010, I have been involved in a project conducting inter alia eddy covariance measurements at a disturbed forest site in the Northern Limestone Alps of Austria. Consequently, application of the CoupModel may provide interesting insights into how surface-atmosphere exchange is controlled at our disturbed ecosystem.

After I arrived in Stockholm, the placement naturally began with a discussion between myself, Professor Jansson and his Master, PhD, and Post-Doctoral students working in related fields. I presented the work that I have been doing here at my home university (BOKU, Vienna) and some of data we have and afterwards there was an exchange ideas regarding how the model can be applied to our site, as well as additional research questions which could be interesting to address.

Overall, the 2 month placement at the KTH was an excellent experience, both for me personally and also in terms of our current research project. While there is still work to do, the initial results look very promising and I will therefore continue this work here in Vienna. Although the period was perhaps brief, I gained a lot from my time working with Professor Jansson. He was an excellent host and an excellent teacher and I will be sure to keep him posted regarding how the work progresses in Vienna. While I owe a lot to Professor Jansson and the other staff members and students at the department, I would finally like to express my thanks to the Society of Biology, as the fellowship made an important contribution to the placement.