

## Completion Report for BSAS Scholarships

**Name and affiliation:**

David Howard, The Roslin Institute

**Award Name and value of the award:**

Alan Robertson Fund for Animal Genetics, £1196

**Was any additional funding secured to support the activity?**

Genetics Society, Junior Scientist Travel Grant, £750

**Start/end date of the award:**

August 17-22, 2014

**Summary of the award (Briefly describe the objectives and how was it undertaken):**

(approximately 300 words)

The purpose of the award was to enable me to attend and make an oral presentation at the 10th World Congress on Genetics Applied to Livestock Production (WCGALP), which was held in Vancouver, Canada from 17th – 22nd August 2014. The WCGALP takes place every four years and is the major international conference dedicated to livestock genetics, attracting key representatives from both academia and industry across the world. The award was used to pay the conference registration fee (£516.48) as well as overnight accommodation (£490.00) for the duration of the conference, with the remaining amount (£189.52) contributing towards the cost of meals, as food was not provided as part of the conference.

My attendance at WCGALP had a number of different objectives:

i). Learning

The schedule for each day of the conference started with an invited plenary speaker, providing an insight into some of the major themes of interest to livestock geneticists. The remainder of each day was devoted to symposia, oral presentations and poster sessions. The symposia were conducted by leading scientists and industry representatives presenting their work and discussing the future direction of their respective fields. The oral presentations included shorter talks from a variety of speakers, themed around a specific topic.

ii). Presenting

There were approximately 1,200 abstracts submitted to WCGALP for consideration as oral presentations. My abstract, regarding the selective advantage of Optimal Contributions, was successful

in being selected for a 15 minute talk in the Selection Theory session. This provided me the opportunity to present and discuss my research with fellow delegates.

iii). Networking

There were events organized on a number of evenings, providing the opportunity to meet and network with geneticists from all around the world. Meal times and breaks also allowed discussions with colleagues and make new contacts.

### **Benefits of the Award:**

This is the main part of the report and the two sections below should be approximately 1000 words in total. You may focus on benefits to yourself, to the animal science community, or both – depending on the nature of the activity undertaken.

#### **Benefit of the award to you (e.g. new knowledge or skills, new contacts and collaborations):**

The decision of the BSAS to provide funding from the Alan Robertson Fund for Animal Genetics allowed me to attend the most prestigious meeting in my field and listen to presentations from the leading scientists working within genetics and livestock production. I went to talks from many different fields of study, including genomic prediction and selection, next generation sequencing and disease resistance. I also attended as many talks as possible covering selection theory, which is my current area of study. By attending a variety of topics I was able to enhance my technical understanding of methodology, and deepen my awareness of the issues and directions that will dominate livestock genetics over the next five years.

My own research, concerning the structural impact of implementing an Optimal Contributions (OC) selection algorithm in livestock, was accepted for inclusion at the conference from around 1,200 submissions. A copy of the abstract which formed part of my original submission is available at: <http://bit.ly/1prLWs7>. The process of going through the submission procedure and also being accepted to present at WCGALP provided me with the opportunity to write a three page abstract and carry out the requested corrections to the manuscript to ensure final acceptance. My presentation was scheduled as an oral presentation in the session entitled “Selection Theory – Managing Genetic Variance”. This provided me with the experience of creating a PowerPoint presentation with an accompanying talk that would succinctly convey the background of my work, what was involved in the analysis as well as the results of the study and the impact that this research will have for the wider scientific and industrial community. The opportunity to present my research to a large audience enabled me to practice public speaking and the feedback regarding the work and the presentation was very encouraging. The discussions I had following my talk were very interesting and productive, providing me with additional avenues of investigation for my research.

The conference provided me with a unique opportunity to gain a much broader insight into the research of others through direct conversations with members from different groups, as well as gaining a more in depth understanding from those working within my own particular field of study. There was also ample

opportunity during the organised activities and breaks to meet, discuss and exchange ideas with those working in livestock genetics. This conference provided me with an excellent opportunity to network, make new contacts, and raise my scientific profile.

Following the completion of my PhD, I am hoping to remain in academia and obtain a postdoctoral position within animal genetics. Attending WCGALP helped me in identifying more clearly the 'hot' topics and allows me to seek the most relevant and exciting academic positions in the future. With the continuing fall in the cost of genotyping, this will lead to an increased number of animals able to be genotyped. This will increase the accuracy and power available for imputation of haplotypes, enabling a move towards this approach to genetic analysis. Haplotypes should in theory allow greater accuracy in the prediction of both phenotype and degrees of relatedness between animals and it will be interesting to follow the progress in this area. Attending and presenting at the WCGALP has also helped me raise my profile in the scientific community and following on from my oral presentation I was in discussion with a Professor from a leading Australian university who was interesting in my work and potential working within his group in the future.

**Benefit of the award to the animal science community, academic and industrial:**

The award enabled me to present the results of my own research to a large and appropriate audience of academic and industrial representatives. The title of my presentation was 'The structural impact of implementing an Optimal Contributions (OC) selection algorithm in livestock'. An extensive effort by the scientific community over the course of a decade, led to the development of OC theory and it has become the state of the art method for maximizing genetic gain for a given rate of inbreeding. Up until now the source of the selective advantage achieved from applying OC has only been predicted from theory and simulated studies.

The research I presented was the first validation of theory and provided evidence, using a real population, that a selective advantage is drawn from the estimated Mendelian sampling term. The use of genomic selection improves the accuracy of the Mendelian sampling term and so, combining genomic selection with a dynamic OC algorithm will generate even greater rates of gain for a predefined rate of inbreeding. The results from my study confirmed to the scientific community that the current direction of incorporating OC selection and genomic information is worthwhile. Directly after my presentation there was the opportunity for audience members to ask questions publicly and later I had a number of interesting conversations with fellow delegates who were working to develop OC for use with genomic information.

The presentation of my research provided confirmation to attendees that the hard work undertaken by the scientific community was worthwhile and that with the currently available technology, genetic diversity is being managed in the optimum way. My PhD is in collaboration with a large pig breeding company and for them it also reaffirms that scientific endeavor is both a cost effective approach to R&D as well as being beneficial in terms of knowledge exchange.

**Other supporting information:**