

## **Report to OERA Student Research Travel Program**

### **University of St. Andrews Statistical Modelling Workshops**

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Topic: Introduction to Statistical Modelling and Spatial Modelling Methods for Correlated Data Workshops  
(<http://creem2.st-andrews.ac.uk/introduction-to-statistical-modelling-and-spatial-modelling-methods-for-correlated-data-workshops/>)

Trip Duration: January 13 – January 23

Destination: University of St. Andrews, St. Andrews, UK

#### Trip Itinerary and Goals

Through the OERA Student Research Travel Program, I was able to visit St. Andrews, Scotland from January 13 – January 23, 2015. During this trip, I attended two statistical modelling workshops held by the University of St. Andrews Centre for Research into Ecological and Environmental Modelling (CREEM).

My personal goals during the workshops were: 1) to learn how to create a predictive model for striped bass presence at the FORCE tidal energy test site, and 2) to improve my understanding of statistical modelling techniques for any future environmental monitoring applications.

#### Benefits of the CREEM statistical modelling workshops

The CREEM statistical modelling workshops were a good fit for me since they were focused on environmental monitoring applications (all exercises were done using real offshore windfarm monitoring data), and they addressed some of the complicated experimental design issues that I have been facing with my thesis data.

The first workshop was two days long, and was an introduction to statistical modelling. In this workshop, I learned how to use linear models and generalized linear models to describe count and binary (presence/absence) data. The instructors, Dr. Monique MacKenzie and Dr. Lindsay Scott-Hayward, covered model specification, fitting, selection, diagnostics, and

interpretation, and gave students the opportunity to work through these processes using environmental monitoring data for sea ducks at an offshore windfarm site.

The second workshop was four days long, and was more advanced. In this workshop, we learned about spatial correlation in datasets and the modelling methods to deal with these added complications. We were taught about one- and two-dimensional modelling methods, as well as generalized estimating equations, and did practical exercises using these techniques. During this workshop, I also had the opportunity to discuss my thesis data with the workshop instructors to get advice on the statistical analysis approach for my project.

### Collaboration with other scientists

This trip also afforded me the opportunity to network with scientists working on a variety of environmental monitoring projects. In addition to informal conversations with many of the other participants, each participant was asked to give a brief presentation on their research background. Through these presentations and discussions, I learned about various renewable energy projects in the UK, and different environmental monitoring policies, study designs, and approaches used elsewhere. I also enjoyed the chance to interact with the CREEM researchers (the workshop instructors, as well as post-doctoral fellows and PhD students), as they are experts in this field and will likely be valuable contacts in the future.

Additionally, due to the fully funded trip to Scotland, I was able to travel independently to the Netherlands, where I met with a fisheries biologist at the Royal Netherlands Institute for Sea Research, and toured the facilities there. We discussed our respective research projects and potential opportunities for collaboration in the future, therefore broadening my perspectives and research network further.

### Overall experience and value

In summary, I am extremely grateful for the opportunities that this award provided me. I developed skills that will assist me not only with my thesis research on tidal energy impacts to striped bass, but also as I build my career as a marine ecologist. I am sure that I will refer back to the CREEM workshop materials frequently. Now that I have returned to Nova Scotia, I am looking forward to applying these methods to assess the potential impacts of tidal energy turbines on fish.