Regional Newsletter, December 2019

In this issue

ELIZABETH WILLIAMSON

Welcome to the Winter 2019-2020 issue of the newsletter of the British and Irish Region of the IBS. Due to unavoidable absences, we had no summer newsletter so this is a bumper edition! As well as the usual offerings from our regional officers, we have a brief introduction to a new committee member (Andy Lynch), reports from meetings that have happened over the last year, reports from bursary awardees, and a note about an exciting upcoming meeting in the field of statistical genetics and genomics.

Kirsty Hassall will be taking over the newsletter after this issue. If you have any items or news you would like to share with the society in future newsletters, please send a message to kirsty.hassall@rothamsted.ac.uk.

President's corner

RUTH KING

It is amazing to think that I am already half-way through my presidency of the BIR. Looking at the round-up of IBS activity this year (including the Young Biometrician Award; Channel Network Conference report; training workshop activity; organised/sponsored events;...) it is great to see strong young talent within the biometric sciences in the BIR and enthusiastic members of our community becoming involved with the IBS. Many thanks to all who contributed in the many different ways to the regional activities (from co-organiser of events to judge to speaker/presenter to participant or applicant). However, unfortunately, offset with this is the continuing trend of a declining membership numbers for the society. This decline is disappointing and thus a call to all in the BIR to encourage colleagues and their students to join the society (it is free for students to join!) and to become involved, for example, by attending events; sending suggestions to the committee for further activities; or volunteering to be a committee member or represent the society at conferences/meetings.

Looking forward to the new calendar year I have some thankyous (and goodbyes – but I am sure will meet again shortly at some IBS events!) to committee member Elizabeth (Fizz) Williamson (LSHTM) and (out-going) vice-president Martin Ridout (University of Kent) as their elected terms come to an end. However, I am very pleased to welcome Kirsty Hassall (Rothamstead Research; who continues her time on the committee after joining in 2018) and Andy Lynch (University of St Andrews) as incoming elected committee members; and Dan Farewell as the (incoming) vice-president before he takes up the role as president in 2021. Kirsty will also take on the important communication role from Fizz as the Biometric Bulleting and BIR newsletter correspondent. Finally, in terms of committee members, Emanuele Giorgio (Lancaster University) will also step down from the committee at the end of this calendar year so that Rafael De Andrade Moral (Maynooth University) has been co-opted on to the committee for 2020. Thank you to Emanuele for his contributions to the committee! And welcome to Rafael.

I am looking forward to the forthcoming calendar year with meetings already being organised for spring and autumn before the AGM and presidential address at the end of the year. I very much hope to see many of you at one (or more) of these local meetings! There is also the International Biometrics Conference in Seoul (South Korea) in July. Next year we will be launching a new initiative to celebrate the use of modern infographics for efficiently and effectively conveying interesting and/or useful biometric information (see later report). Additional changes for next year also includes a revised BIR website – there has been significant activity behind-the-scenes working with the international society to modernise the webpages including some added functionality. Dan and Kirsty have been leading the discussions in relation to this (see later item) – many thanks again!

To conclude – I hope to see many of you at one of the meetings next year – but if you have feedback or other suggestions or wish to become more involved with the society please do contact either myself or Rachel McCrea.

Secretary's Corner

RACHEL MCCREA

My first year as secretary of the BIR is drawing to a close

and I would like to express my thanks to everyone on the committee who has helped me to work out the systems and processes! It has been a very rewarding first year, working with a great committee and the next two years will be even more eventful with a great selection of meetings in the pipeline. This year the Channel Network Conference was held in the UK and a special thanks goes to committee members Kirsty and Lisa who devoted a lot of time to helping with the administrative side of this endeavour and also to those individuals who assessed the bursary applications for this meeting. The Young Biometrician Award was held this year and attracted a lot of excellent nominations from across the UK and this is always a lovely competition to coordinate to see the high quality of the papers. Looking ahead to next year, the next IBC will be held in Seoul, South Korea in July. Please do consider supporting this meeting by submitting abstracts and attending.

Welcome to new committee members

Andy Lynch

Since 2017 I have been the Professor of Statistics in Bioscience at the University of St Andrews, where I am based both in the School of Mathematics and Statistics and in the School Medicine. Prior to this I spent a decade in research at the Cancer Research UK Cambridge Institute following a number of post-doctoral research posts in Cambridge (medical statistics) and Newcastle (process control). My PhD from Sheffield was primarily on the topic of modelling crop yields and was partly sponsored by Horticulture Research International (Wellesbourne).

New committee member: Andy Lynch.

My research interests are split between development of analysis methods for the data from new technologies in molecular biology, and more applied work in understanding the biology of cancer (especially prostate cancer), although I have several collaborations in other areas. For three years I was on the Conferences & Events Programme Board of the RSS, I have been on the organizing committees of a number of European Bioconductor meetings, and helped organize the 2011 Isaac Newton Institute programme on Design of Experiments.

Meeting reports

7th Channel Network Conference, Rothamsted UK, 10-12 July

Kirsty Hassall, CNC local organising committee

Sunshine greeted around 120 delegates to the 2019 7th Channel Network Conference, a biennial conference hosted jointly by the British-Irish, France, Belgium and Netherlands regions of the IBS. This year, the conference took place at Rothamsted Research, the longest running agricultural research institute in the world and coincided with the centenary celebrations of RA Fisher's appointment in 1919 to the institute.

The conference was a resounding success with attendees from more than 65 organisations varying from Wageningen University in the Netherlands, to the University of Washington in the US and onto the University of Wollongong, Australia.

7th Channel Network Conference attendees.

Per Andersen from the University of Copenhagen gave the keynote lecture on Multi-State Models in Medical Research. Topics of the conference covered all interests of the IBS ranging from methods development in the 'omics to design of experiments. Invited sessions were organised around the topics of Intensive Longitudinal Data, Post-selection Inference in Regression, Complex Survival

Data and a special session was organised on the past, present and future of statistics in agriculture.

A particular highlight was the 39th Fisher Memorial Lecture, given by Brian Cullis and Alison Smith on their work in the development of Design Tableau, thus closing the conference.

Of course, no conference is complete without some socialising. My personal favourite was watching 60 statisticians be loaded onto the back of a tractor-pulled trailer and taken on a tour of the oldest and newest long-term field experiments.

Presentations and posters will be available to download in due course - keep an eye out!

Channel Network Conference: Tour of field experiments.

Report from the 7th Channel Network Conference

Sara Wade, Lecturer in Statistics and Data Science, University of Edinburgh

First, I would like to express my sincere gratitude to the British and Irish Regional Section of the International Biometric Society and the Fisher Memorial Trust for their support to attend the 7th Channel Network Conference, held at Rothamsted Research on 10-12 July, 2019. I enjoyed the conference and would also like to thank the organisers for all of their hard work in putting together a successful event.

I am a recently appointed Lecturer in Statistics and Data Science within the School of Mathematics, University of Edinburgh. The conference provided a wonderful opportunity to establish networks within the biometrics community and exposure to cutting-edge research. My research lies in statistics and machine learning, with a focus on Bayesian methodology. While I have led and collaborated on various projects with a biomedical application, particularly in Alzheimer's disease studies, most of my engagement, particularly in terms of conferences, has been within the Bayesian and machine learning communities. This conference provided me the opportunity to branch out and establish new connections. Moreover, the regional focus of the conference increases the possibility of further building on these connections.

My own talk focused on novel mixtures of experts methodology, which we applied to predict cognitive decline in Alzheimer's disease based on clinical and genetic information. I enjoyed presenting to the diverse audience and receiving feedback. Moreover, the other talks within my session by Dr. Rouanet, also on mixtures of Gaussian processes applied to Alzheimer's data, and Dr. Schepers, on biclustering, were very interesting and relevant, and I appreciated our discussions afterwards.

In collaboration with colleagues at Edinburgh, I am exploring novel Bayesian clustering models for single-cell RNA sequencing data, as well as for integration of multiple and temporal omics data. I was quite intrigued to learn more about cutting edge research in this direction on bioinformatics and statistical genetics. As I have a keen interest in Bayesian analysis, I also found the talks on Bayesian methodology and applications quite interesting.

Lastly, I would like to close by once again thanking the organisers and the BIR and Fisher Memorial Trust, as well as the keynote, invited, contributed speakers and poster presenters for the high-quality programme. I also wish to express my gratitude to the Young Biometrician Award Panel for acknowledging our paper entitled `A Bayesian nonparametric regression model with normalized weights: A study of hippocampal atrophy in Alzheimer's disease', with an Honourable Mention.

Report from the 7th Channel Network Conference

Nseobong Uto, Doctoral candidate, University of St Andrews, Scotland

It was quite an exciting first experience at CNC and Rothamsted. The conference was well attended, and the various presentations — both oral and poster — were well structured, and I had an opportunity to present a poster reflecting part of the results of my PhD work, and this was preceded by a brief/flash talk about the work.

I had the opportunity to meet and interact with some PhD colleagues from various institutions across the UK and beyond, and also a couple of experts working on

the design of experiments, where my research interest lies. This has paved way for possible collaboration for research purposes.

I was able to attend, on the first day of the conference, one of the three short courses — Design of multifactor experiments in biological research — organised by the conference body, where some concepts in the design of experiments were discussed. Furthermore, one of the contributed sessions was dedicated to talks on Design of Experiments, from where I could listen to some interesting talks.

I also benefited immensely from the Fisher memorial lecture, which was given on the last day of the conference. This created an awareness of some developments in the analysis of experiments.

I was among the conference attendees on a facility tour of Rothamsted Research to the Sample Archive, where I could see preserved samples of crops, soils, fertilisers and manures that were used for the early experiments at Rothamsted. Moreover, I also made a tour to the Museum, in company of some attendees, where I saw some tools, such as the Millionaire calculator used by Sir Ronald Aylmer Fisher, and Frank Yates, for research at Rothamsted in the early days.

Finally, I've got to know a lot about what Rothamsted Research (formerly, Rothamsted Experimental Station), founded by John Bennet Lawes and Joseph Henry Gilbert, is all about, including its historical perspective.

Report from the 7th Channel Network Conference

Peter Godolphin, MRC CTU at UCL

I was delighted to attend the Channel Network Conference, run by the British and Irish Region of the International Biometric Society (IBS) at Rothamsted Research in July 2019. I was supported for this conference through a bursary from the British and Irish Region of the IBS and the Fisher Memorial Trust. Below I detail my experiences from the conference, including why I believe this conference is a great opportunity for a young biometrician.

First, I will begin with a brief introduction. My background is in Mathematics, and I graduated from the University of Birmingham in 2014. I then continued my studies with a Masters in Medical Statistics from the University of Leicester. Finally, I continued my midlands tour by finishing up at the University of Nottingham, working for a year as a Research Assistant before starting a PhD in Clinical Trials Research in 2016. I am now in the final stages of the PhD, and had just submitted my thesis before the Channel Network Conference. Whilst the majority of my research is focused around clinical trial methodology, I have kept a passion for more theoretical work, first realised during my final year research project at Birmingham. I have continued involvement in a collaboration in experimental design that explores missing data in studies utilising a cross-over design. Therefore, this was only the second biometrics conference I had attended.

My experiences from the conference:

The conference itself was hosted in the picturesque Harpenden, within the delightful campus of Rothamsted Research – one of the oldest agricultural research institutions in the world. Given my interest in experimental design, the strong links between Rothamsted and Fisher made the venue that bit more special. The conference itself had three streams, and after receiving my program, I marked down sessions that piqued my interest the most, including Design of Complex Experiments, Time Series and Statistics for Agriculture. I was lucky enough to have the opportunity to present my work in the Design of Experiments session of the second day, so I spent part of the first day watching the other presenters, hopefully picking up tips from their presenting styles.

At the breaks, the buffet-style-lunch encouraged networking, and the posters were situated in the room next door, with plenty of space to view each poster and chat with the presenter (something other conferences I have been to have lacked!). The delegates were friendly, and as the only person from my department, the environment was not intimidating and instead I found it welcoming for someone early in their research career. A real highlight for me was networking after my presentation, with a large number of delegates engaging me in interesting debate and conversation regarding my talk. Other highlights of the conference included some excellent talks on each day, some interesting excursions that enabled further understanding of Rothamsted's history and networking that continued into the conference dinner!

Why a young biometrician should attend:

My experiences from the conference, as alluded to above, were highly positive and I met a number of other early career researchers, all of who had similarly positive experiences. The conference had a broad range of talks, covering a vast array of different research areas and research settings (e.g. agriculture, medicine etc.). I think this was beneficial for me as an early career researcher, as I got the opportunity to hear about statistics across a

range of different areas. This enabled me to see the large number of different possibilities there are to forge a career as a biometrician, as well as getting a snapshot of the research potentially involved in each of these areas.

In addition, my experiences in giving what was my first oral presentation at a non-student conference were brilliant. This conference was student friendly and senior academics engaged in positive debate, rather than being unnecessarily critical if any of the young speakers did not fully understand their questions, or who maybe did not have as broad a knowledge base on the subject as they did. The space for presenting posters was also excellent, and as an early career researcher, I think this was an excellent conference to present your work in a friendly setting to very knowledge experts in your area. Overall, I would recommend the Channel Network Conference to my colleagues, and urge early career researchers to attend the 8th conference, and hope they will get as much out of it as I did at Rothamsted!

The 39th Fisher Memorial Lecture

Kirsty Hassall

The 39th Fisher Memorial Lecture was given on 12 July 2019 by Brian Cullis and Alison Smith on Design Tableau, a framework for deriving the structure of mixed models for use in analysing comparative experiments. There are many examples where the increasing accessibility of software encourage a "black-box" approach to statistical analysis. Linear mixed models are no exception with the consequence of dubious misleading analyses of comparative experiments often published. Brian and Alison make this point by drawing on the parallels between ANOVA and mixed models highlighting the fundamental concepts of randomisation in the presence of blocking variables. To ignore this is to inflate the power of the comparative tests.

Alison Smith at the 39th Fisher Memorial Lecture.

Within the Design Tableau framework, Brian and Alison presented an accessible step-by-step formulation of the linear mixed model ensuring the experimental design structure is maintained throughout the process. With such a framework, statisticians can work in the more flexible realm of mixed models (as opposed to the restrictive ANOVA paradigm) safe in the knowledge the subsequent hypothesis tests will respect the constraints of the experiment at hand. No longer shall we see incorrectly specified random effects!

Brian Cullis at the 39th Fisher Memorial Lecture.

Workshop on Geostatistical Methods for Disease Mapping

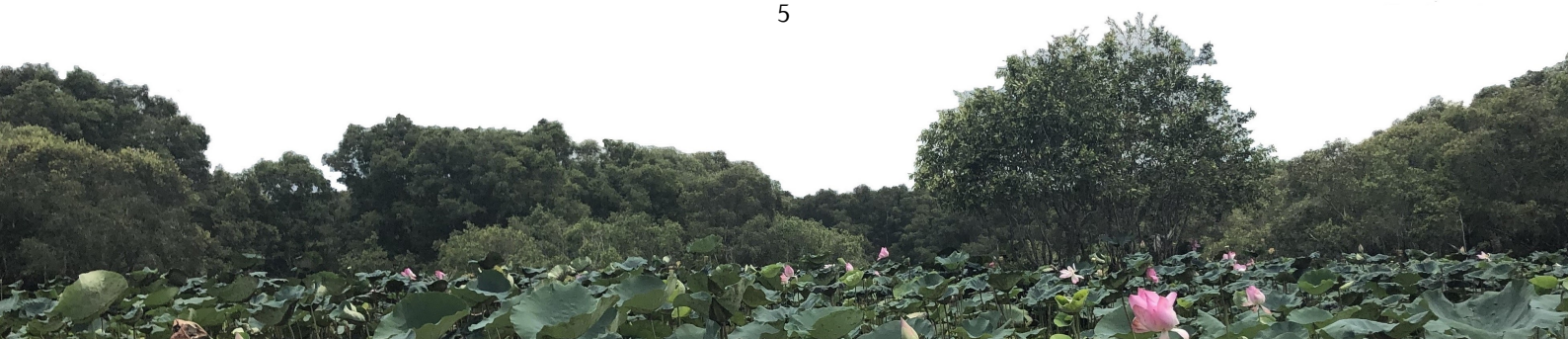
Emanuele Giorgi

We are delighted to report that the "Workshop on Geostatistical Methods for Disease Mapping" organised and delivered by Emanuele Giorgi and Peter Diggle was a great success!

The workshop brought together 28 early-career researchers in statistics and epidemiology from across the UK. During the first two days, the participants learned how to carry out a geostatistical analysis, from exploratory to spatial prediction and visualization of uncertainty, using the PrevMap R package.

The third day of the workshop also gave the participants the opportunity to discuss their research challenges, some of which were solved on the day thanks to the newly learnt statistical techniques.

Based on the received feedback forms, all of the participants found the workshop to be highly accessible and with high quality teaching. Emanuele and Peter are strongly motivated to turn this into a yearly event and



are happy to announce that a one-day version of this workshop will be run as a short course for IBC2020 to be held in Seoul!

Participants at the Workshop on Geostatistical Methods for Disease Mapping.

Report on meeting: New perspectives on studying the effects of treatment on a time to event outcome

Ruth Keogh

In October 2019, following the AGM, over 50 attendees joined a scientific meeting on the topic of "New perspectives on studying the effects of treatment on a time to event outcome". The meeting, which took place at the London Mathematical Society in Russell Square, was jointly hosted by the London School of Hygiene & Tropical Medicine's Centre for Statistical Methodology, who kindly supplied the break-time refreshments. The first of five talks came from Professor Sarah Darby FRS, from the University of Oxford, who spoke of her important work on addressing the challenges of quantifying the benefits and risks of cancer treatments, focusing on the use of radiotherapy for treatment of breast cancer. While radiotherapy reduces breast cancer mortality, there is also evidence that it increases mortality from heart disease and second cancers, and Sarah and her group wanted to combine these risks and benefits to predict the effect of radiotherapy on overall mortality. The study combined evidence from trials, epidemiological studies and National Cancer Registration data. Dr Jonathan Bartlett from the University of Bath was our second speaker. Jonathan gave a very clear and thought-provoking discussion on the topic of "Causally valid treatment effects from Cox models". The Cox proportional hazards model is extremely popular for analyzing time-to-event data, and results are typically presented in terms of hazard ratio estimates. Jonathan took us through some of the literature from recent years which has questioned the causal interpretation of hazard ratios for treatment or exposure effects. He outlined how we can use Cox models to obtain estimates of alternative effect measures which causally valid, including a risk ratio or risk difference.

Dr Clemence Leyrat from the London School of Hygiene & Tropical Medicine kept our attention before the break with a talk on the hot topic of emulating a target trial using observational data in the presence of immortal time bias. The motivation was the need to understand the benefits of surgical treatment for non-small-cell lung carcinoma. In the absence of randomized trial evidence, Clemence and colleagues from the LSHTM Cancer Survival Group used observational data, together with clever causal inference methods, to estimate the causal effect of receiving surgery within 6 months of diagnosis on 1-year survival. The analysis used data from the English Cancer Registry linked to electronic health records.

Continuing on the causal inference theme after the break, I took the opportunity to present some ongoing work on estimating causal effects of treatments on survival using longitudinal observational data, where treatment status and patient characteristics are measured at regular visits. I focused on describing the 'sequential trials' method, which is a neat approach based on emulating a series of artificial trials within the longitudinal data from a series of time origins. I explained what this approach estimates and applied it to data from the UK Cystic Fibrosis Registry to study the impact on survival of sustained use of a commonly used treatment.

Our final speaker was Dr Shaun Seaman from the MRC Biostatistics Unit, University of Cambridge, who also focused on estimation of treatment effects on survival using longitudinal observational data. Shaun introduced a new method which is based on 'structural nested cumulative survival time models'. He explained the advantages of this new approach over alternatives, including that it allows both binary and continuous treatment variables and irregular measurement times. This work was recently published in Biometrics, where R code for implementing the methods is also available (https://onlinelibrary.wiley.com/doi/full/10.1111/biom.13158).

There were many questions from the audience throughout and attendees hopefully left the meeting with new ideas and enthusiasm for applying the methods described to their own research questions.

Report on David Finney lecture

Kirsty Hassall

The IBS co-sponsored the 3rd Annual David Finney Lecture on "Statistical Research and its Benefit to Society" which took place at the University of Edinburgh on the June 10th, 2019. The speaker was Prof Iain Dryden

(University of Nottingham) who focused on "Object Data Driven Discovery" and the development of modern statistical techniques for analysing object data, with wide applications from medicine to linguistics, and everything in between. For more details (including a video of the lecture) see: https://centreforstatistics.maths.ed.ac.uk/cfs/events/past-events/3rdfinney.

Young Biometrician Award

The British and Irish Region of the International Biometric Society (IBS-BIR), jointly with the Fisher Memorial Trust, award a prize every two years for young biometricians who are members of the British and Irish Region of the International Biometric Society. The award recognises the research of one paper published, or accepted for publication, in a refereed journal. This award comprises a diploma and a prize of £1000.

We are delighted to announce that the BIR-FMT 2019 Young Biometrician Award has been won by Sean Yiu for the paper "Covariate association eliminating weights: a unified weighting framework for causal effect estimation" (Biometrika 2018; 105, 709-722).

The panel also gave honourable mention to Sara Wade for the paper "A Bayesian nonparametric regression model with normalized weights: a study of hippocampal atrophy in Alzeimer's disease" (Journal of the American Statistical Association 2014; 109, 477-490) and to Ming Zhou for the paper "Removal models accounting for temporary emigration" (Biometrics 2019; 75, 24-35).

Upcoming meetings

Anestis Touloumis

There will be a meeting of the British and Irish Region (BIR) of the International Biometric Society (IBS) in Spring 2020 (organised by Andy Lynch and Anestis Touloumis), with the theme of "Statistical Genetics and Genomics". More details about speakers, location and registration to follow early in the new year.

Website updates

Daniel Farewell

Many of you will be aware that the International Biometric Society is carrying out a major overhaul of the main IBS website (http://www.biometricsociety.org/). As a small part of this redevelopment project, the British and Irish Region is testing a new website of its own! Our new digital home will be a microsite within the main international webpages, and is to serve as a template for smaller IBS regions that currently have little or no web presence. The microsite will be fully integrated into the new IBS systems, with a single login and offering the prospect of exciting new functionality, like a forum for online discussion between speakers and BIR members following regional events. We hope to be rolling out the new BIR site early in 2020 but, in the meantime, our existing site remains operational thanks to the ongoing skill and patience of our web developer, Paul Fearn. Thanks, Paul!

Is it a chart? Is it a plot? No, it's an infographic!

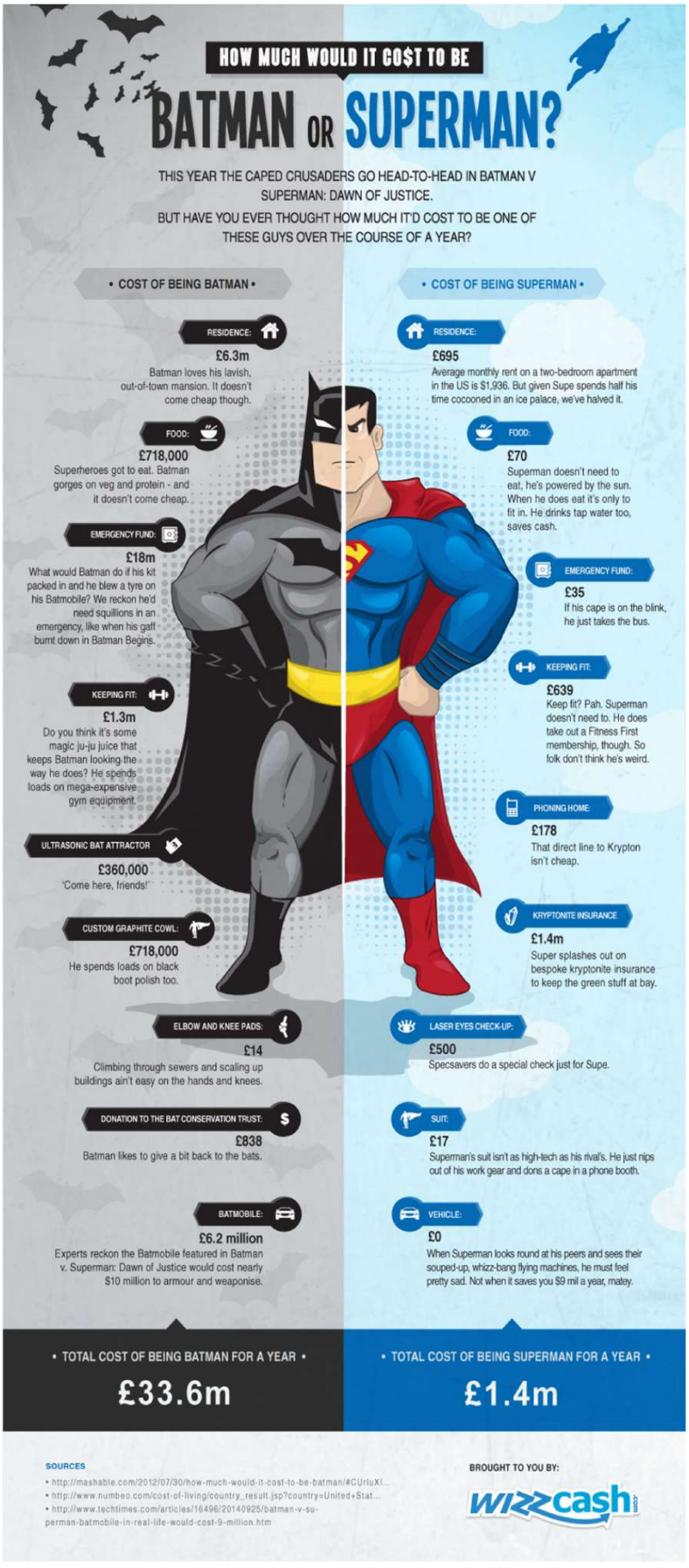
Daniel Farewell

Have you produced a visualisation that tells a great story, or that spices up a standard display? We want to hear all about it. The BIR are pleased to announce the

2020 Infographic of the Year competition!

Submit your entries to farewelld@cf.ac.uk for your chance to win two — yes, two! — free passes to BIR-organised scientific meetings during the 2021 calendar year. And of course there's the massive street cred, or if you prefer, CV points. Permissions permitting, we'll be highlighting selected contributions in the BIR newsletter and at scientific meetings throughout the year, so stay tuned for updates!

Inspiration for the 2020 Infographic of the Year competition!



Taken from: *https://visual.ly/community/infographic/animals/how-much-would-it-cost-bebatman-or-superman*