

# RSS International Conference

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FOR ALL STATISTICIANS AND DATA SCIENTISTS  
**ALL WELCOME**

## Conference Directory

Headline sponsor

**WILEY**

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[rss.org.uk/conference2019](https://rss.org.uk/conference2019)  
[#RSS2019Conf](https://twitter.com/RSS2019Conf)

# Visit Wiley during the RSS 2019 International Conference



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## Add the joint YSS/Wiley Author Workshop to your schedule.

Getting your research published and maximising its impact  
**Wednesday 4th September, 11:50am – 1:10pm**

### Speakers:

- **Brian Tarran**, Editor, *Significance* magazine
- **Dr Jouni Kuha**, Joint Editor of the *Journal of the Royal Statistical Society, Series A*
- **Stephen Raywood**, Senior Journals Publishing Manager, Wiley
- **Beverley Harnett**, Senior Marketing Manager, Wiley

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# Welcome

## I wish you a warm welcome to the historic city of Belfast for the 2019 RSS Conference.

I am delighted to welcome the conference back to Northern Ireland and, with ICC Belfast located in the heart of the city on the banks of the river Lagan, I hope during your visit you will explore and enjoy everything our incredible city has to offer.

I am thrilled to say we have an exciting programme of talks and social events planned throughout the week. With ten keynote speakers, a wide variety of parallel sessions, a large selection of posters and rapid-fire talks, we certainly have an extremely diverse and stimulating programme lined up. This year we will also be holding our inaugural Data Ethics Day, supported by the Ada Lovelace Institute, on Wednesday, and will have a unique 'in conversation' format to the Significance Lecture on Tuesday around 'Fighting fake news' – two topical areas that I'm sure will spark discussions.

As well as enjoying a wealth of statistics and data science, there are great opportunities to relax and catch up with friends at the social events, which will be held in two of the most iconic venues in Belfast. The Ulster Hall, previous host to U2 and The Rolling Stones amongst many others, will be the setting for the Welcome Reception on Monday evening, whilst proceedings will close at Titanic Belfast, voted the World's Leading Tourist Attraction 2016, with the Conference Dinner which will be held in front of the legendary Titanic staircase. We also have the annual pub quiz of the Young Statisticians' Section to look forward to on Wednesday and with the Section celebrating its 10th anniversary this is sure to be a night to remember.

I hope you have a memorable, productive and thoroughly enjoyable week in Belfast!



**Lisa McFetridge**  
Programme Chair,  
RSS 2019 Conference

## With thanks to our sponsors:

Headline sponsor:  
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Data Ethics Day:  
**Ada Lovelace Institute**



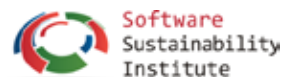
Business, Finance &  
Industry stream:  
**Department of  
Management Sciences,  
City University of  
Hong Kong**

香港城市大學  
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Data Science Stream:  
**Deloitte**

**Deloitte.**

Young Statisticians'  
Reception:  
**Software Sustainability  
Institute**



# General event information

## Badges

Conference attendees are asked to wear their badges and lanyards at all times while at the Conference.

Lost badges will be replaced at the discretion of the conference organisers. A replacement fee may be charged.

## Catering (Daytime)

Lunch as well as tea/coffee at the mid-morning break and the mid-afternoon break is provided as part of your conference fee. All refreshments will be served in the Exhibition area in Halls 1C&D on the 1st floor of the ICC Belfast. Due to the large number of attendees at the conference there will be queues for refreshments, especially at lunchtime, so we do ask you to be patient and stagger your arrival at the serving points wherever possible.

## Cloakroom

A staffed cloakroom will be available in the Riverside Foyer on the ground floor of the ICC Belfast. This will be open each day during the hours of the conference programme. The Society accepts no responsibility for any items which may be lost or damaged.

## Conference App

The app is available to download from the conference website: <https://events.rss.org.uk/rss/270/home>

Visit:

[rss.org.uk/conference2019](https://rss.org.uk/conference2019)

[#RSS2019Conf](https://twitter.com/RSS2019Conf)

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## Dietary requirements

For those attendees who have notified the organisers of special dietary requirements\* the following arrangements will be made:

- Lunchtimes – please ask a member of catering staff
- Thursday night dinner – please make yourself known to the RSS staff at the desk when entering the Titanic Suite for dinner following the pre-dinner drinks reception. You will be given a card to display on the table in front of you.

*Please note that at the reception on Monday evening canapés are being served and nibbles at the Tuesday evening reception.*

The conference organisers have tried to cater for all dietary requirements, however for some social events the venues may be limited on what they can accommodate. If you are concerned about this, please contact the RSS conference team.

*\* N.B. There will be vegetarian options provided at lunchtime and the evening receptions which do not require any special arrangements but for the conference dinner vegetarians should talk to the RSS registration staff as above.*

## Exhibition

The exhibitors' stands are located in Halls 1C&D alongside the catering area. This area will be open at the following times:

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**TUESDAY 3 SEPTEMBER      8.30AM – 8.00PM**

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**WEDNESDAY 4 SEPTEMBER   8.30AM – 5.30PM**

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**THURSDAY 5 SEPTEMBER    8.30AM – 3.30PM**

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Please make time to visit our exhibitors – you will find in your packs an 'Exhibition Passport' in which you can collect stamps from the exhibitors – there is a competition for those who can collect the most stamps.

Please note that not all stands will be present on all days of the conference.

## Meeting conduct

The Society operates a meeting conduct policy and requires attendees to adhere to the policy at all times while in the conference and its associated events. The full text of the policy can be found on the conference website, on the noticeboard by the registration desk and in your conference packs.

## Mobile phones

We ask that you switch your mobile phones and other hand-held devices to silent when you are in sessions.

## Photography and filming sessions

The Society will have a photographer taking photographs in many sessions and at social events. The Society may use photographs taken in conference reports, publications and in future publicity materials. If you would prefer your photograph not to be used in this way please contact the conference manager.

Please note that the Society will also be recording a number of sessions during the conference which will be made available from the Society's website in due course. The RSS conference staff will be able to advise which sessions are being recorded.

## Poster presentations

Posters will be on display in Halls 1C&D throughout the conference. As well as the poster reception on Tuesday evening there will be two lunchtime organised viewing sessions on Wednesday and Thursday – please see the relevant insert at the back of the directory for the list of posters being presented.

## Presentation Desk

For speakers wishing to submit or amend their presentations during the conference and for poster presenters registering their poster the presentation desk is located in the Riverside Foyer on the ground floor.

## Registration desk

The conference registration desk can be found on the left-hand side (as you enter) of the Riverside Foyer of the ICC Belfast.

The Registration desk will open at the following times:

**MONDAY 2 SEPTEMBER** 3.00PM – 6.30PM

**TUESDAY 3 SEPTEMBER** 8.00AM – 6.00PM

**WEDNESDAY 4 SEPTEMBER** 8.00AM – 6.00PM

**THURSDAY 5 SEPTEMBER** 8.30AM – 3.30PM

## Session locations

Plenary sessions will be held in Hall 1A on the 1st floor of ICC Belfast. All other sessions will be held in one of: Hall 1B on the 1st floor, Boardrooms 1 and 2 on the 2nd floor, and the six Meeting Rooms (1A – 3B) on the 3rd floor.

**ALL sessions are open to all attendees registered to attend on the relevant day (unless otherwise stated)**

## Social events

If you have booked to attend one of the evening social events this will be indicated on your conference badge. There are no tickets for these events, however you will be required to present your badge on entry to the Welcome Reception and the Conference Dinner, and you will only be served at the Awards & Poster Reception if you are wearing your badge.

## Stewards and Staff

RSS stewards (in RSS t-shirts) and RSS staff members (identified by their badges) will be happy to assist you throughout the conference. The members of the Conference Board will also be identifiable by their badges.

## Timings for presentations

The following timings for presentations will **normally** apply:

- Keynote talks: 30-45 minutes plus time for questions and discussion
- Invited talks: 20-30 minutes plus time for questions and discussion
- Contributed talks: 20 minutes including time for questions and discussion
- Rapid-fire talks: 5 minutes with no questions or discussion

## Twitter

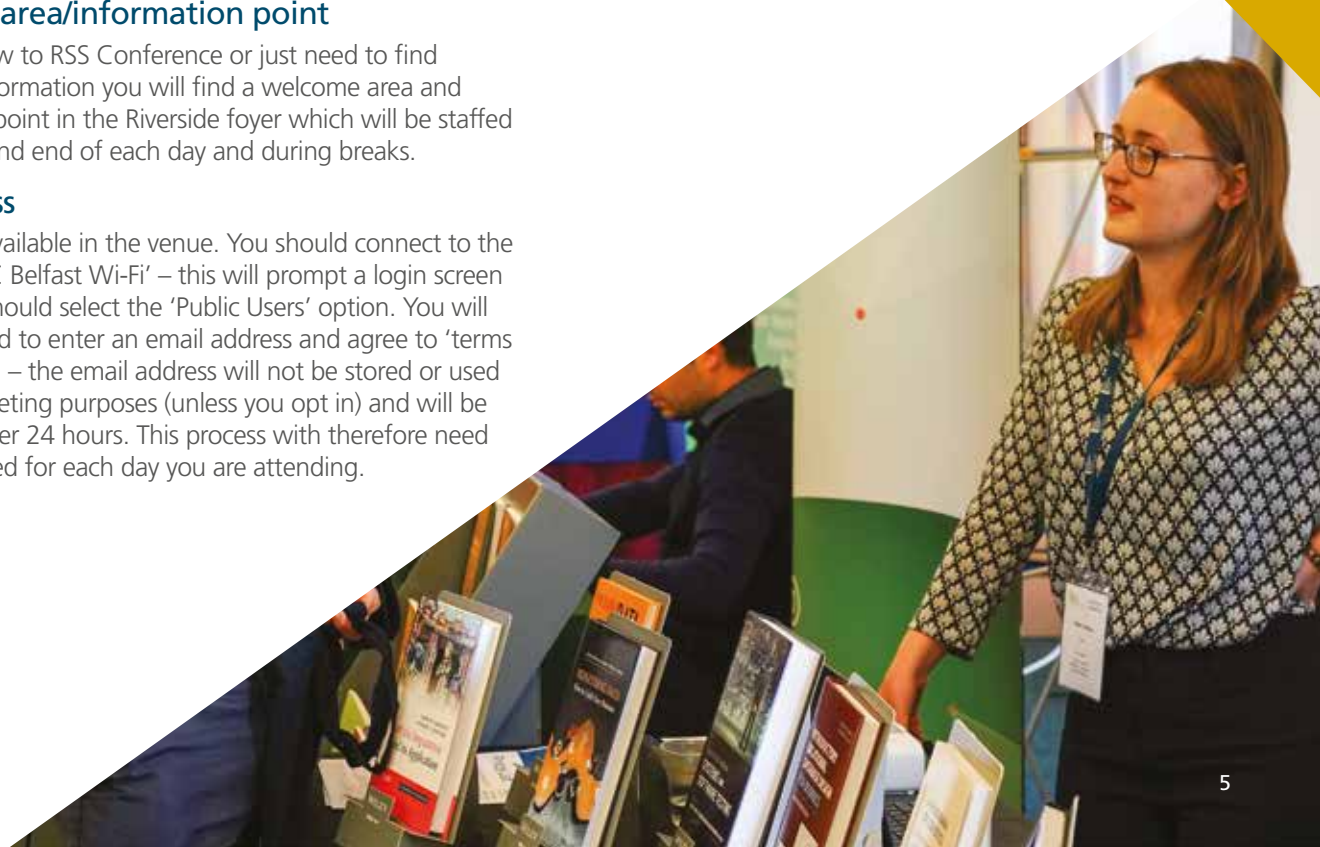
You can follow the conference on Twitter: **RSSAnnualConf** please use the hashtag **#RSS2019Conf**

## Welcome area/information point

If you are new to RSS Conference or just need to find out some information you will find a welcome area and information point in the Riverside foyer which will be staffed at the start and end of each day and during breaks.

## WiFi access

Free wifi is available in the venue. You should connect to the network 'ICC Belfast Wi-Fi' – this will prompt a login screen where you should select the 'Public Users' option. You will then be asked to enter an email address and agree to 'terms & conditions' – the email address will not be stored or used for any marketing purposes (unless you opt in) and will be forgotten after 24 hours. This process will therefore need to be repeated for each day you are attending.



# Exhibitors at RSS 2019 Conference



**1/2 Royal Statistical Society** - Come along to the RSS stand and chat to the membership team to find out more about how you can gain formal recognition for your statistical qualifications and experience, find out more about our volunteering opportunities, and discover how you and your colleagues could benefit from joining our community of over 10,000 members. We're also running a competition to win a year's free membership – check your delegate pack to find out how to enter.



**6 JMP** is a business unit of SAS that produces interactive software for desktop statistical discovery. Introduced in 1989 with scientists and engineers in mind, JMP has grown into a family of statistical discovery products used worldwide in almost every industry. From its beginnings, JMP software has empowered its users by enabling interactive analytics on the desktop. [www.jmp.com](http://www.jmp.com)



**7 Jumping Rivers** is a leading provider of bespoke training and consultancy in both R & Python. Our training courses have been recognised by the Royal Statistical Society and our trainers have been certified by RStudio. As one of only seven RStudio Full Service Certified Partners, we have a variety of plans for managing RStudio products. From on-demand support to full care plans. If R or Python is crucial to your organisation, we can help.



**8 Minitab®** is the leading software for statistics education worldwide. Minitab provides a comprehensive collection of statistics and graphs to help instructors teach, and includes a user-friendly design that allows students to quickly master the software and learn statistical concepts. Since thousands of distinguished organizations in more than 100 countries use Minitab, learning statistics with Minitab also prepares students for a wide range of jobs in the real world. There's a reason our software is the package of choice at more than 4,000 colleges and universities around the world. Learn more: [www.minitab.com/academic/](http://www.minitab.com/academic/)



**3/4 Wiley** is a global provider of knowledge and knowledge-enabled services that improve outcomes in areas of research, professional practice and education. We partner with learned societies, including the Royal Statistical Society, and support researchers to communicate discoveries that make a difference. Our digital content, books and 1600 online journals build on a 200-year heritage of quality publishing. For further information, visit [wileyonlinelibrary.com](http://wileyonlinelibrary.com)



**9 The Sensible Code Company** - We make TableBuilder; it applies a real time anonymisation algorithm to large confidential datasets to allow them to be published safely. It's being tested by the ONS for disseminating Census 2021 data. The system will allow more data to be published sooner and with more granular access for diverse populations.



**5 ADR UK** (Administrative Data Research UK) is a partnership transforming the way researchers access the UK's wealth of public sector data by linking data from across different parts of government and facilitating safe and secure access to accredited researchers. ADR UK is made up of three national partnerships and the Office for National Statistics (ONS).



**10 Wolfram Research** - Best known for Mathematica and Wolfram|Alpha, Wolfram Research has been pioneering computational intelligence and scientific innovation for over three decades. Wolfram provides a highly integrated technology stack for multi-paradigm data science including the very latest methods in machine learning, computer vision, predictive analytics and automated reporting.

**Deloitte.**

**11/12 Deloitte** - With over 900 practitioners in Northern Ireland, Deloitte provide clients with a range of transformation services from strategy through to delivery and managed services. Our delivery capability includes deep engineering expertise in automation, cloud, cyber, data analytics, data science and digital.



**15 The Best Practice and Impact division** in the Office for National Statistics supports everyone in the Government Statistical Service or involved in producing government statistics through consultancy, training, guidance and more. The division includes the Good Practice Team, Quality Centre and Harmonisation Team. Come see how we can help YOU!!!



**18 Exploristics** - Provide a range of expert analytics and data analysis services to clients in the health, pharma and life sciences industries. We create streamlined, flexible solutions and bespoke approaches that help our clients extract the most information from a wide range of data sources.



**13 Northern Ireland Statistics and Research Agency (NISRA) -**

The go-to organisation for an accurate and insightful account of life in Northern Ireland. We inform public policy decision-making, provide comprehensive registration and genealogy services, conduct the census and provide the data underpinning the NI Programme for Government. The insight we provide guides the decisions of others.



**16 The Office for National Statistics (ONS)** produces the numbers that matter most – on the economy and business, people, population and communities. We are the executive office of the UK Statistics Authority and the largest producer of official statistics in the UK. Our collective mission is to provide high quality statistics, analysis to help the UK make better decisions.



**19 Allstate** is driven by data. Our data divisions solve some of today's most complicated analytics problems, to deliver perfect insurance solutions to our customers. We are avid about learning and applying new tools and techniques to get the most value from our massive data resources. We partner with technology and the business, incorporating analytics into every aspect of the organisation.



**14 Cambridge University Press** is a not-for-profit publisher that dates from 1534. We are part of the University of Cambridge and our mission is to unlock people's potential with the best learning and research solutions. Visit our stand to discuss publishing with us, browse our publications and get a 20% discount.

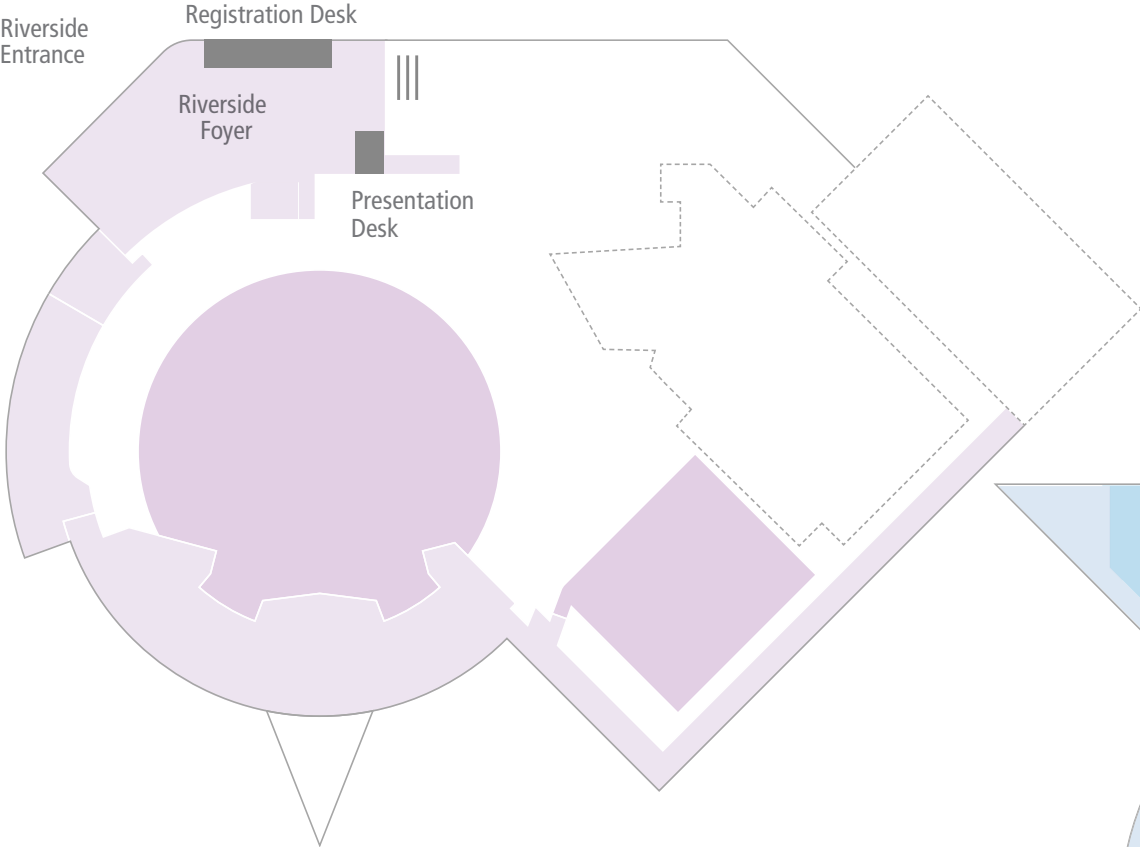


**17 SAGE Publishing** - Founded in 1965, SAGE Publishing is an independent company that disseminates journals, books, and library products for the educational, scholarly, and professional markets. [www.sagepublishing.com](http://www.sagepublishing.com)

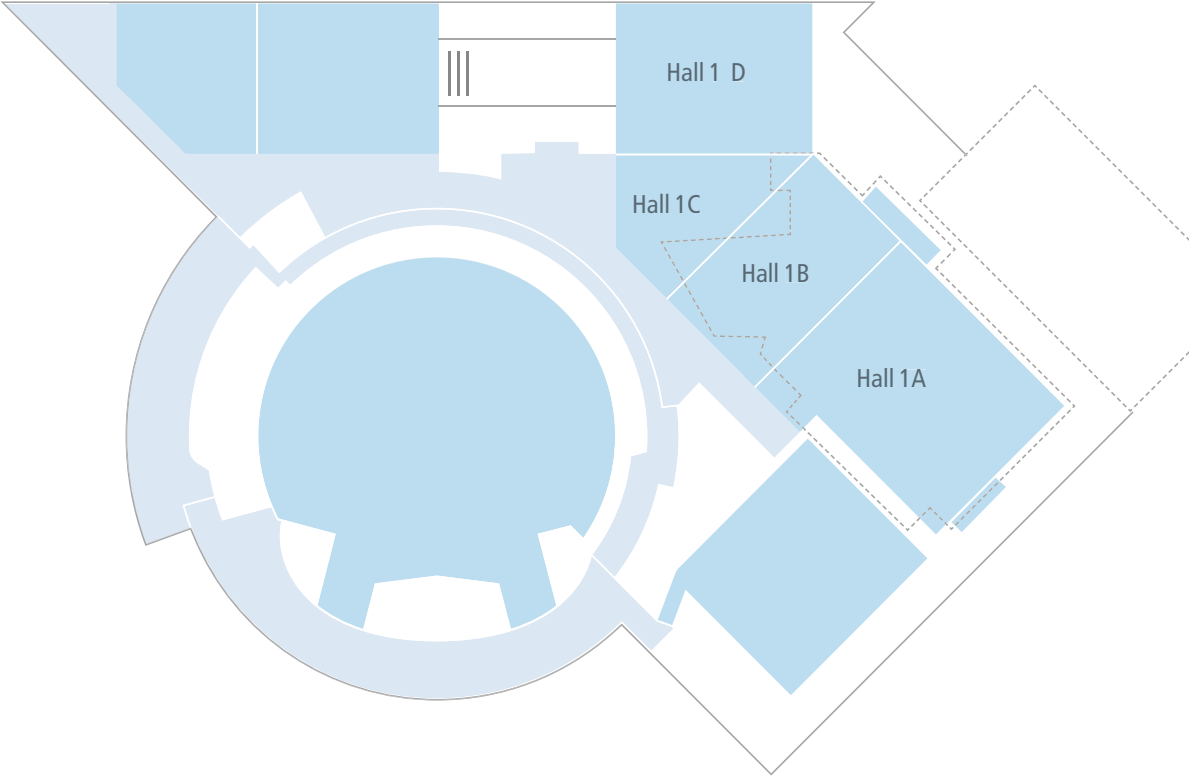
**BELFAST**  
2-5 SEPTEMBER 2019

# Venue Plan

## Ground Floor



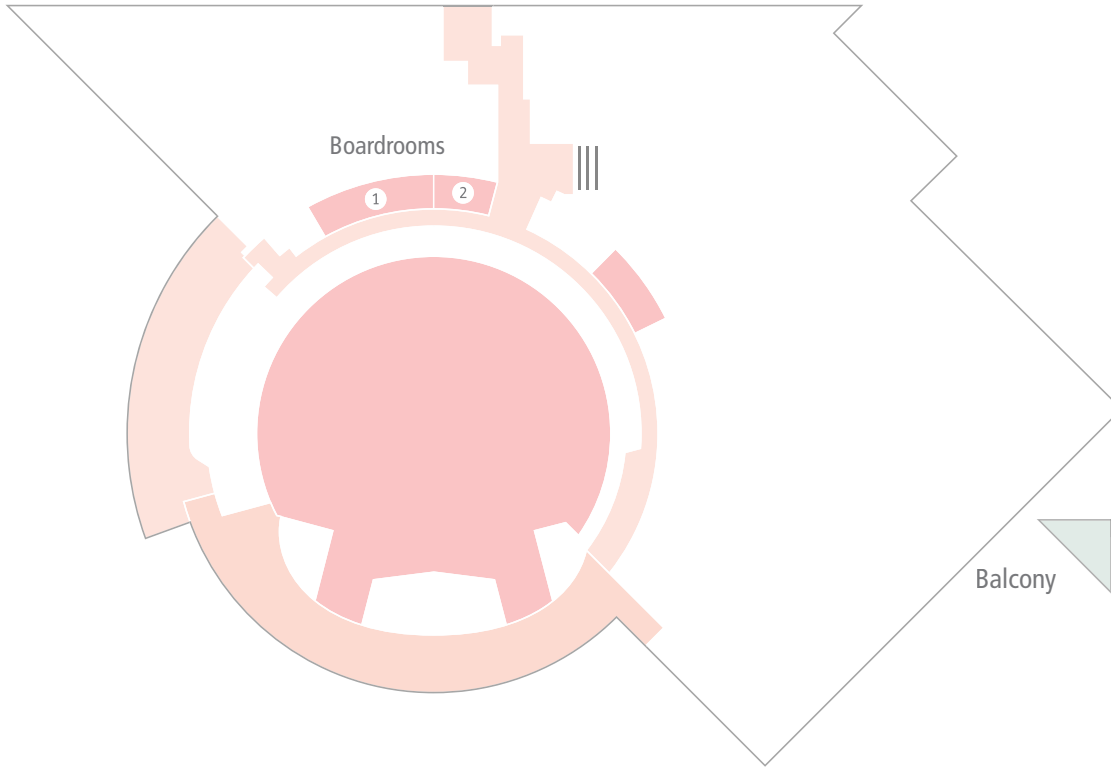
## Level 1



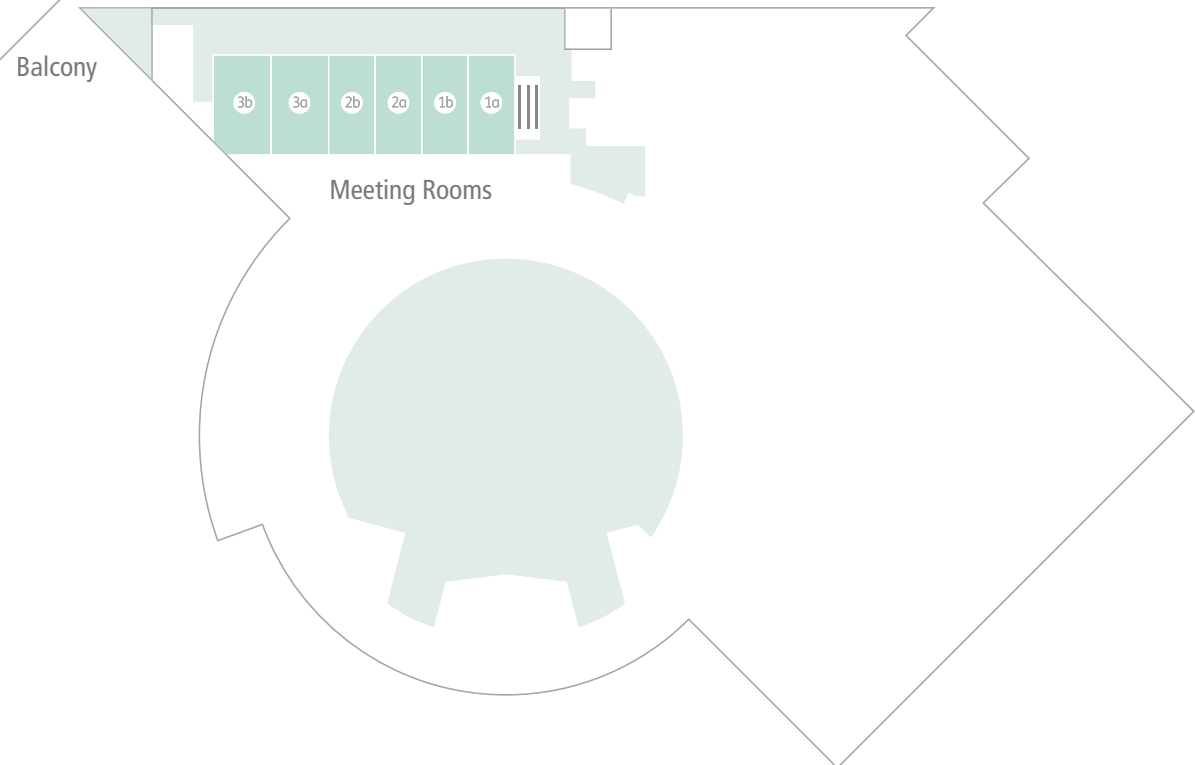
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**Level 2**



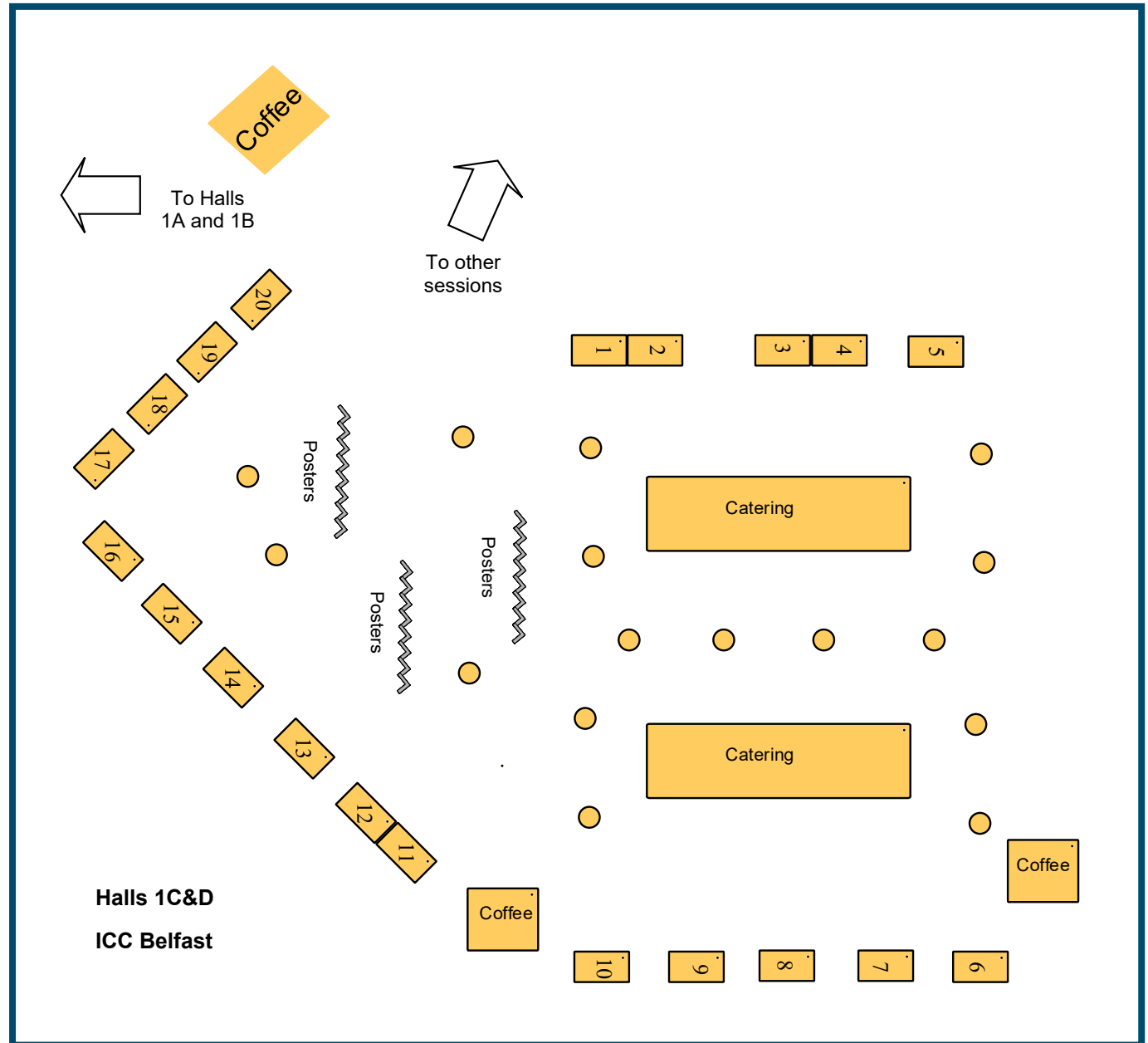
**Level 3**

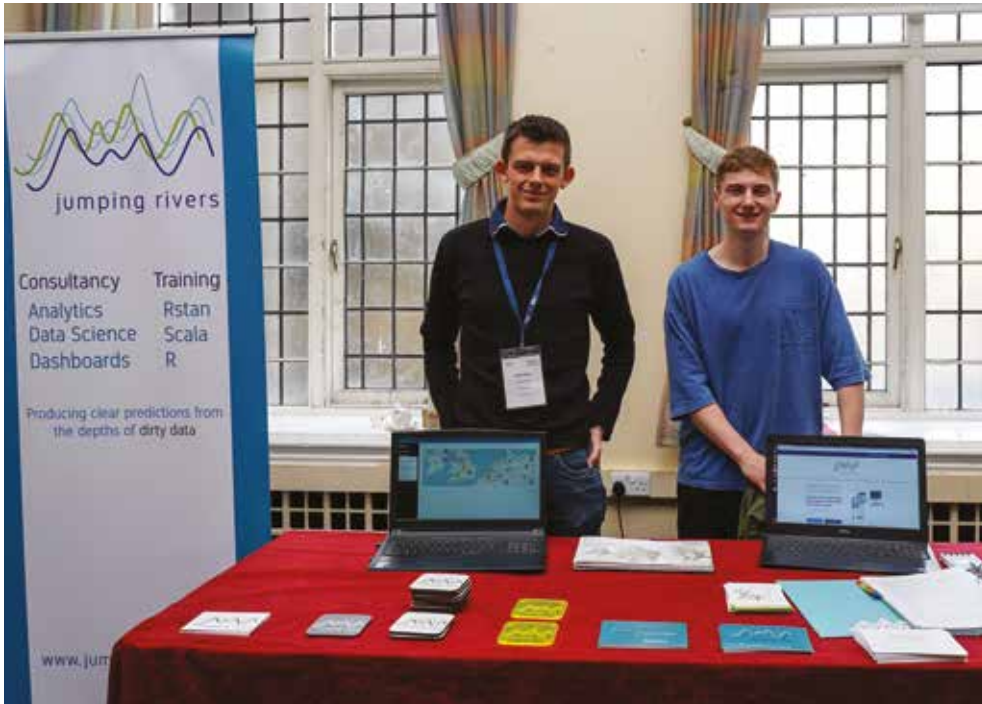


# Exhibition Plan – Level 1

## Key to exhibitors

1/2	Royal Statistical Society
3/4	Wiley
5	ADR UK [Tuesday/Wednesday]
6	JMP SAS [Tuesday/Wednesday]
7	Jumping Rivers [Tuesday/Wednesday]
8	Minitab [Tuesday/Wednesday]
9	The Sensible Code Company
10	Wolfram
11/12	Deloitte
13	NISRA
14	Cambridge University Press
15	Best Practice & Impact Division, ONS
16	Office for National Statistics
17	SAGE Publications [Tuesday/Wednesday]
18	Exploristics [Wednesday only]
19	Allstate [Tuesday/Wednesday]





**ROYAL  
STATISTICAL  
SOCIETY**  
DATA | EVIDENCE | DECISIONS

# RSS International Conference 2020

**WELCOMING** ALL STATISTICIANS  
AND DATA SCIENTISTS

**BOURNEMOUTH**  
7-10 September 2020

The 2020 Conference will take place in Bournemouth a seaside resort on the south coast of England, located east of the Jurassic Coast, a World Heritage Site.

The conference will once again feature top keynote speakers, invited and contributed talks, poster presentations and professional development workshops.

We are currently calling for proposals for invited topic sessions - see the website for full details.

When registration opens attendees at the 2019 Conference will receive an additional 10% discount for a limited period.

**Registration will open shortly**  
[rss.org.uk/conference2020](https://rss.org.uk/conference2020)

**Visit:**  
[rss.org.uk/conference2020](https://rss.org.uk/conference2020) #RSS2020Conf

**RSS International Conference 2021**  
6-9 September, Manchester  
**Save the date**  
More information coming soon. Stay tuned!





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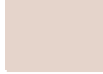




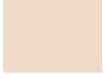






The majority of our faculty hold PhDs from acclaimed universities around the world. Our faculty publish regularly in leading journals in Statistics, Operations Management, and Operations Research. We are ranked 38<sup>th</sup> worldwide in the latest UTD Business Research Ranking.

For more information, visit <http://www.cb.cityu.edu.hk/ms/>.

# Full Programme

All conference sessions are organised in streams.

For ease of reference each stream is represented by a colour in the programme:

	Applications of Statistics		Networking
	Communicating & Teaching Statistics		Official Statistics & Public Policy
	Data Ethics		Other
	Data Science		Prize winners
	Environmental & Spatial Statistics		Professional Development
	Business, Industry & Finance		Rapid Fire
	Keynote		Refreshments
	Medical Statistics		Social Statistics
	Methods & Theory		

# Day 1 Monday 2 September

# Day 2 Tuesday 3 September

Monday 2 September

17:30 – 18:45

Welcome to Conference and Keynote 1

Keynote

## Hall 1A

**Speaker:**

Siobhan Carey – Chief Executive, Northern Ireland Statistics and Research Agency

The Mirror and the Lamp: Reflections on the role of official statistics, official statisticians and the challenges they face.

19:00 – 20:00

Networking

Welcome Reception: Ulster Hall

Tuesday 3 September

08:30 – 09:45

Other

The Young Statistician's Guide to the Conference

## Hall 1B

Organised by Lucy Teece, Emily Granger and Sarah Nevitt on behalf of the RSS Young Statisticians Section

Whether you are new to RSS conference or a seasoned attendee, this session will help you build your own conference programme, along with tips for getting the most out of conference and a run-down of the Young Statistician Section's (YSS) highlights.

**Presenters include:**

Lucy Teece – YSS Chair 2019 and

Rob Mastrodomenico – Vice-Chair, Statistics in Sports Section

09:00 – 10:00

Medical Statistics

1.1 Contributed – Medical Statistics: Data linkage

## Meeting Room 3B

Education and health outcomes of children treated for chronic conditions

Michael Fleming – University of Glasgow, United Kingdom

Evaluating the effects of an admission avoidance home visiting programme for frail, elderly patients in NHS Forth Valley

Maria Cristina Martin – University of Strathclyde, United Kingdom

Risk prediction models that use routinely collected electronic health data: generalisable and useful in heterogeneous settings?

Yan Li – Farr Institute for Health Informatics Research University of Manchester, United Kingdom

Official Statistics & Public Policy

1.2 Contributed – Official Statistics and Public Policy: Quality and value in official statistics

## Meeting Room 2A

Hospital Standardised Mortality Ratio – Improving quality and safety of Scottish hospitals through the exploration and modelling of mortality

Robyn Munro – NHS NSS

Dependent on Dover? Estimating and visualising the value of EU trade by UK port of entry for consumer goods

Jonathan Lewis – Civil Service

Reproducible Analytical Pipelines for Health and Social Care Publications

Jack Hannah – NHS National Services Scotland

Environmental & Spatial Statistics

1.3 Contributed – Environmental & Spatial Statistics:

## Boardroom 2

Combining citizen science and survey data in a log-Gaussian Cox process framework to estimate the monthly space-use of Southern Resident Killer Whales

Joe Watson – University of British Columbia

Detecting and Communicating changes in Waste Water Treatment Plant performance in Ireland

Jason Larkin – Environmental Protection Agency Ireland

Understanding model fit for simulating species dispersal using alternative cost metrics

Laura Merritt – University of Reading / Centre for Ecology and Hydrology, United Kingdom

# Day 2 Tuesday 3 September

## Social Statistics

### 1.4 Contributed – Social Statistics: Neighbourhoods

#### Boardroom 1

Neighbourhood change in Britain, 1971– 2011

**Chris Lloyd** – Queen’s University Belfast

Life at the Frontier: Conceptualising the Causes and Consequences of Ambient Social Frontier Propensity

**Gwilym Pryce** – University of Sheffield

Career Satisfaction, Work Resources and Health of Employees and of Their Children: Evidence from 1,883

Chinese Dual-Earner and Only-Child Households

**Chunyi Chen** – Shandong University

## Method and Theory

### 1.5 Contributed – Methods and Theory: Causal Inference

#### Meeting Room 2B

Interpreting estimates of mediated effects from studies with attrition: an example from a study of maternal depression and child neurodevelopment

**Nicola Fitz-Simon** – National University of Ireland Galway, Ireland

Bayesian nonparametric estimation in longitudinal mediation: A Baron-Kenny based estimator for cross-lagged models

**Andrej Srakar** – Institute for Economic Research (IER), Ljubljana and Faculty of Economics, University of Ljubljana

## Medical Statistics

### 1.6 Contributed – Medical Statistics: Risk Factors

#### Meeting Room 3A

Incorporating misclassification error from finite mixture models into generalised linear models: an illustration from serological survey of RSV in England

**Ania Zylbersztejn** – UCL Great Ormond Street Institute of Child Health, London, United Kingdom

Quantifying effects of some socio-demographic risk factors on Lyme disease incidence in Scotland

**Jude Eze** – SRUC

Evaluation of two-part models for semi-continuous patient reported outcome measures: an application to a clinical trial of lower back pain

**James Griffin** – Department of Statistics, University of Warwick, United Kingdom

## Data Science

### 1.7 Contributed – Data Science: Words

#### Meeting Room 1A

Feature2Vec: Distributional Semantic Modelling of Human Property Knowledge

**Steven Derby** – Queens University Belfast, Ecit, Department of Data Science and Scalable Computing, United Kingdom

Clustering the citation network of a computer science conference

**Clement Lee** – Lancaster University, United Kingdom

**Deloitte.**

## Medical Statistics

### 1.8 Contributed – Medical Statistics: Changing practices

#### Meeting Room 1B

A fresh look at the James-Stein estimator shows that ‘dynamic borrowing’ of historical data is an illusion

**Nicholas Galwey** – GlaxoSmithKline, United Kingdom

Epidemiological characterisation and classification of disease

**Anthony Webster** – NDPH, University of Oxford, United Kingdom

Improving transparency about “power” and trade-offs in subgroup selection: assessing criteria and statistical models for subgroup selection

**Claudia Geue** – University of Glasgow, United Kingdom

10:10 – 11:30

## Medical Statistics

### 2.1 Medical Statistics: Investigation of and overcoming practical dilemmas within medical research

#### Meeting Room 3B

Organised by **Helen McAnaney** and **Lisa McFetridge** – Queen’s University Belfast

Under-representation in clinical trials: participants with rare diseases, reporting and awareness

**Helen McAnaney** – Centre for Public Health, Queen’s University Belfast

Analytical challenges of harmonising and integrating diverse datasets / study types

**Amy Jayne McKnight** – Centre for Public Health, Queen’s University Belfast

When are cost-effectiveness models not cost-effective?

**Felicity Lamrock** – Mathematical Sciences Research Centre, Queen’s University Belfast

# Day 2 Tuesday 3 September

## Official Statistics & Public Policy

**2.2 Official Statistics & Public Policy: International comparisons of health outcomes – opportunities and challenges of using routinely collected administrative databases**

### Meeting Room 2A

Organised by Ania Zylbersztejn and Pia Hardelid – Child Health Informatics Groups, UCL Great Ormond Street Institute of Child Health

Comparing maternal and child outcomes across countries using prospectively planned, pooled analyses of administrative data: the devil is in the detail  
**Katie Harron** – UCL, United Kingdom

International comparisons of primary care quality using admissions for ambulatory care sensitive conditions: the example of asthma in children  
**Irina Lut** – UCL ICH, United Kingdom

Using administrative linked datasets to explain differences in child mortality between England and Sweden: opportunities and challenges

**Ania Zylbersztejn** – UCL Great Ormond Street Institute of Child Health, London, United Kingdom

The unique opportunities and critical limitations of using routinely collected national data for international comparisons of maternal and newborn health  
**Jennifer Zeitlin** – Inserm

## Environmental & Spatial statistics

**2.3 Environmental & Spatial Statistics: Applications of hidden Markov models in ecology**

### Meeting Room 3A

Organised by Byron Morgan – University of Kent

A continuous-time Arnason-Schwarz model for the annual movement of bottlenose dolphins  
**Sina Mews** – Bielefeld University, Germany

A test for the underlying state-structure of Hidden Markov models: A case study of partially observed capture-recapture data  
**Rachel McCrea** – University of Kent, United Kingdom

Modelling latent animal movement and behaviour in population abundance surveys using hidden Markov models  
**Richard Glennie** – University of St Andrews

Modelling population dynamics using hidden Markov models  
**Takis Besbeas** – Athens University Economics Business / University of Kent

## Social Statistics

**2.4 Social Statistics: The better understanding of society – methodological innovation on Understanding Society**

### Meeting Room 1B

Organised by Paul Clarke – University of Essex

Understanding the impact of web mode on quantitative analysis of data from Understanding Society  
**Paul Clarke** – University of Essex, United Kingdom

A latent class approach to inequity in health using biomarker data  
**Apostolos Davillas** – Office for Health Economics and University of Essex

Obtaining consent for the linkage of social media data with large-scale population surveys  
**Tarek Al Baghal** – University of Essex

Do Income Summary Screens Improve Income Data Quality?  
**Paul Fisher** – University of Essex

## Methods & Theory

**2.5 Methods and Theory: Modern Fisherian perspectives on inference**

### Meeting Room 2B

Organised by Heather Battey – Imperial College London

Modified maximum likelihood estimation through adjusted scores  
**Nicola Sartori** – University of Padova, Italy

Conditioning and Randomisation in Selective Inference  
**Alastair Young** – Imperial College London, United Kingdom

## Communicating & Teaching Statistics

**2.6 Communicating & Teaching Statistics: The rise of #Stats Twitter – Risks and rewards of social media use by statisticians**

### Hall 1A

Organised by Darren Dahly – University College Cork

The internet had radically altered how scientists and statisticians can interact with each other and the public. Statisticians have taken to social media, such as blogs, blog comments, and Twitter for a variety of reasons. These include teaching statistical methods, post-publication peer review and other critiques, promotion of statistical literacy, and professional networking.

Social media is also used by statisticians to more widely discuss other issues that impact our field, such as sexism and career development.



# Day 2 Tuesday 3 September

The social media landscape occupied by statisticians has thus grown considerably over the past 10 years, and now features statisticians from all over the world, at all career stages. However, the value of social media participation does not come without risks. These include concerns over the appropriateness of public critique outside of traditional academic media, trolling and online abuse, organizational social media policies, and the perception that social media use is a waste of time. The aim of this session is to help attendees weigh the pros and cons of social media use and maximize its value to their work as statisticians.

## Speakers:

**Erika Cule** – GSK London

**Darren Dahly** – HRB Clinical Research Facility Cork, University College Cork

**Altea Lorenzo** – Biomathematics and Statistics Scotland

**Maarten van Smeden** – Leids Universitair Medisch Centrum

## Data Science

### 2.7 Data Science: Transform, Supercharge, Create – Harnessing AI technologies

#### Meeting Room 1A

Organised by Robyn Foyster on behalf of the PwC AI team led by Euan Cameron

PwC is harnessing AI technologies to transform our clients' businesses and our own.

Our AI team will present three talks where we have used data science to:

- 1) Transform the efficiency of our business
- 2) Supercharge existing PwC offerings
- 3) Create new client services

## Communicating & Teaching Statistics

### 2.8 Communicating & Teaching Statistics: Recent innovations in school statistics: remediations

#### Boardroom 1

Organised by James Nicholson and Jim Ridgway – Durham University

Recommendations for assessment of statistics in A-level Mathematics

**James Nicholson** – Durham University, United Kingdom

Using real data across the curriculum at secondary level

**Darren Macey** – Cambridge Maths

## Professional Development

### PD1 Professional Development: CStat and GradStat: What? Why How?

#### Hall 1B

Organised by Maria Sudell and Ricky McGowan on behalf of the RSS Young Statisticians Section and Professional Statistician's Forum

How and why should you become a professional member of the RSS?

Speakers will provide information and share their own experiences of the application process, followed by a discussion of what modern-day young statisticians, GradStats and CStats look like.

## Speakers:

**Ricky McGowan** – RSS Professional Affairs & Accreditation Manager

**John MacInnes** – Chair of RSS Professional Affairs Committee

**Rob Mastrodomenico** – Owner Global Sports Statistics

11:30 – 12:00

Refreshment break

Hall 1C/D

12:00 – 12:45

Keynote

**Keynote 2 – Campion (President's Invited) Lecture**

Hall 1A

Speaker:

**Charlotte Watts** – Chief Scientific Adviser, UK Department for International Development

12:50 – 13:15

Other

**Annual General Meeting of the Royal Statistical Society**

Hall 1A

All welcome

Agenda papers can be found on the website

13:15 – 14:10

Lunch

Hall 1C/D

# Day 2 Tuesday 3 September

13:20 – 14:10

## Networking

### Young Statisticians Reception

#### Riverside Foyer

Come and meet the RSS Young Statisticians' Section and other statisticians over lunch.

Everyone welcome, of all ages, backgrounds and experiences!

Sponsored by  
Software Sustainability Institute



14:10 – 15:30

## Medical Statistics

### 3.1 Medical Statistics: Papers from the Journal of the Royal Statistical Society

#### Hall 1A

Organised by Martin Owen on behalf of the RSS Journal Series Editors

Semiparametric Model for Bivariate Survival Data Subject to Biased Sampling

Jin Piao – University of Southern California, United States

Landmark linear transformation model for dynamic prediction with application to a longitudinal cohort study of chronic disease

Yayuan Zhu – University of Western Ontario

Adaptive design in surveys and clinical trials: similarities, differences and opportunities for cross-fertilization

Michael Rosenblum – Johns Hopkins University, United States

## Others

### 3.2 A Hundred Years Ago R.A. Fisher Started at Rothamsted

#### Meeting Room 3A

Organised by John Aldrich on behalf of the RSS History of Statistics Section

In 1919 the agricultural station at Rothamsted recruited Ronald Fisher (1890 –1962) to analyse historic data on crop yields. For him it was the beginning of a spectacular career and for Rothamsted the beginning of a Statistics Department which became a force in world statistics. The session considers what the appointment did for Fisher and what Rothamsted did, and goes on doing, for statistics.

Rothamsted and the Making of Sir Ronald Fisher Sc.D., F.R.S.  
John Aldrich – University of Southampton

From Fisher to Big Data: 100 years of Statistical Research at Rothamsted

Gavin Ross – Rothamsted Research (Retired)

Discussion of historical papers and survey of current challenges and fortunes

Andrew Mead – Rothamsted Research

## Environment & Spatial Statistics

### 3.3 Environment and Spatial Statistics: Using electronic health records to model spatial variation in disease risk

#### Boardroom 1

Organised by Emanuele Giorgi – Lancaster Medical School

Spatio-temporal Modelling of Trends in Benign Prostate Hyperplasia drugs prescriptions in Scotland  
Federico Andreis – University of Stirling, United Kingdom

Disaggregation of areal unit count data  
Craig Anderson – University of Glasgow

A spatially discrete approximation to log-Gaussian Cox processes for modelling spatially aggregated disease counts data

Olatunji Johnson – Lancaster University, United Kingdom

## Social Statistics

### 3.4 Social Statistics: The Social Metrics Commission's new measure of poverty for the UK

#### Meeting Room 3B

Organised by David Beckett and Matt Oakley on behalf of the Social Metrics Commission

This session will consider the new poverty metric for the UK, which the Social Metrics Commission launched in September 2018.

The session will provide participants with an overview of the methodology and results and then discuss: the practical implications of the measurement framework that has been developed; how others in the UK might adopt it; and what it says about how poverty should or could be measured internationally. It will also outline ongoing work to improve the measure, and how participants can support that goal.

#### Speakers:

Matt Oakley – Social Metrics Commission  
Department for Work & Pensions  
London School of Economics

# Day 2 Tuesday 3 September

## Method & theory

### 3.5 Methods and Theory:

#### Pseudo likelihood theory and methods

#### Meeting Room 2B

Organised by Heather Battey – Imperial College London

Robustness of inference for GLMMs under model misspecification

Helen Ogden – University of Southampton, United Kingdom

Towards fully-efficient estimation

Ioannis Kosmidis – University of Warwick, United Kingdom

Pseudo likelihoods are used, inter alia, to improve the finite sample properties of likelihood-based inference when an appreciable number of nuisance parameters are present. The session will cover recent advances in this field.

## Communicating & Teaching Statistics

### 3.6 Communicating & Teaching Statistics:

#### Weaving statistical software through University teaching and learning

#### Meeting Room 2A

Organised by Simon Harden and Elinor Jones on behalf of the RSS Special Interest Group in Teaching Statistics in Higher Education

As statistical computing is now a vital part of the practice of Statistics, University curricula in Statistics are steadily responding by incorporating the teaching of relevant software. During this panel discussion we propose to examine:

- The choice of statistics packages to teach to specialist students and/or non-specialist students
- How should we teach statistical software so that students are competent in analysing data?
- Effective ways of weaving statistics software into the teaching and learning of statistical theory

- Examples of innovative practice in engaging and motivating students in the use of statistical software

#### Panellists:

William Browne – Bristol University

Elinor Jones – UCL

Meena Mehta Kotecha – LSE

Jamie Sergeant – Manchester University

## Data Science

### 3.7 Data Science: Equipping the analysts with the data science skills they need to make an impact – stories from different sectors

#### Meeting Room 1A

Organised by Peter Fullerton and Adele Marshall on behalf of the ONS Data Science Campus and Queen's University, Belfast

The Royal Society's Dynamics of data science skills report (<https://royalsociety.org/topics-policy/projects/dynamics-of-data-science/>), published in June 2019, set out a vision of the UK as a leading data science research nation and identified a sharp rise in demand for data scientists with specialists in the field being highly sought after across organisations, from government departments to technology start-ups.

In this session you will hear from three speakers experienced in growing data science skills in different sectors.

They will highlight successful programmes, expose the lessons learned and set out the benefits of cross-sector collaborations. There will then be an opportunity to ask the speakers questions in a panel session chaired by Peter Fullerton from the ONS Data Science Campus.

#### Speakers:

Adele H Marshall – Queen's University, Belfast

David Johnson – Office for National Statistics (ONS) Data Science Campus

Danny McConnell – Deloitte

**Deloitte.**

## Business, Industry & Finance

### 3.8 Business, Industry & Finance:

#### Contemporary Challenges in Industrial Statistics

#### Meeting Room 1B

Organised by Idris Eckley – Lancaster University

Next generation methods for industrially-focussed earth-observation imagery

Louise Lloyd – Rezatec, United Kingdom

Novel methods for sensor-based streaming data

Idris Eckley – Lancaster University, United Kingdom

Personalised marketing: challenges and recent advances

Arnoldo Frigessi – University of Oslo, Norway

香港城市大學

City University of Hong Kong

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## Professional Development

### PD2 Data FAIRification using R/Rstudio workflows

#### Hall 1B

Organised and Presented by Darren Dahly and Brendan Palmer – Statistics & Data Analysis Unit, HRB Clinical Research Facility

As funders seek ways in which the visible research outputs from their support can be maximised, adoption of open science practises are increasingly forming part of emerging funding calls. However, there is little guidance on how to implement these tools, and researchers can be intimidated by the complexity of choice and the multitude of options.

In this session, we will demonstrate an R/Rstudio workflow that includes the steps needed to assemble and package research data in a manner that adheres to FAIR data principles.

# Day 2 Tuesday 3 September

This session is aimed at researchers with a background in R/RStudio. Using a broadly applicable example workflow, we will take you through the 'FAIRification' of a sample data set. We will finish by demonstrating the final packaging of the research project through the use of the Open Science Framework ([www.osf.io](http://www.osf.io)) and assignment of digital object identifiers (DOI).

## Professional Development

### PD11 Statistics and Machine Learning: Better Together

#### Boardroom 2

Organised by Wolfram Research

#### Presenter:

Mark Braithwaite (Wolfram)

An interactive and example driven exploration showcasing computational capabilities of the Wolfram Programming Language. This presentation will cover classical statistics, machine learning and other data-driven computations and show how to bring these tools together to extract new insights from your data and improve decision making.

The talk will begin with an overview of how the power of the Wolfram Language can be applied to classical statistics, followed by examples of how to set up highly-automated machine learning from scratch. These two disciplines will be brought together to show the power of Multiparadigm Data Science followed by examples of deployment in the real world.

Wolfram is leading the charge in Multiparadigm Data Science, and this talk will show some of the steps taken to make machine learning into just another tool for everyday statistics and how anyone who has a basic knowledge of coding and an interest in the concepts of machine learning can utilise a truly multiparadigm approach to data science.

15:40 – 16:30

## Rapid Fire

### Rapid Fire Talks 1

#### Meeting Room 1B

A Bayesian Model Averaging Approach to g-Parameter Priors Elicitation

Saheed Afolabi - Ibadan, Nigeria

How GSK is helping to increase statistical capabilities in sub-Saharan Africa

Lindsay Kendall - GSK, United Kingdom

Valuation of preference-based measures: could borrowing strength from existing countries' valuations produce better estimates

Samer Kharroubi - American University of Beirut, Lebanon

Statistical reproducibility for (multiple) pairwise tests in pharmaceutical product development

Andrea Simkus - Durham University / AstraZeneca, United Kingdom

Assessing local chlamydia screening performance by combining survey and administrative data to account for differences in local population characteristics

Nathan Green - Imperial College London, United Kingdom

Counterfactual Analysis Using Censored Duration Data

Andres Garcia-Suaza - Universidad EIA

Drug utilisation reporting using administrative claims data in Ireland

Lea Trela-Larsen - University of Limerick

### Rapid Fire Talks 2

#### Meeting Room 2B

Mapping the uncertain future of longevity: an ensemble approach for forecasting mortality

Mark Hancock - Northumbria University, United Kingdom

Multivariate Correction for Attenuation of a Congeneric Measurement Model without Correlated Errors: A Test of the Bock and Petersen Approach

Scott Colwell - University of Guelph

On Parameter Estimation of the Hidden Gaussian Process in perturbed SDE

Li Zhou - Shandong University, Weihai, China

Model Averaging in a Multiplicative Heteroscedastic Model

Alan Wan - City University of Hong Kong, Hong Kong

Robustness of Space-Filling Orthogonal Array Based Composite Design to Missing Observation

Abimibola Oladugba - Department of Statistics, University of Nigeria, Nsukka, Nigeria

Easy and intuitive multivariate normal quadrant probabilities

Julia Crook - Mayo Clinic, United States

Calculation of Relative Threshold Levels for the Capacity of Benefits from the Arthroplasty Surgery using the Quantile Polynomial Regressions

Sujin Kang - Imperial College London, United Kingdom

# Day 2 Tuesday 3 September

## Rapid Fire Talks 3

### Meeting Room 3A

Program evaluation and causal inference for distributional and functional data: estimation of the effects of retirement on health outcomes

Andrej Srakar - Institute for Economic Research (IER), Ljubljana and Faculty of Economics, University of Ljubljana

Estimating the correlation between bivariate survival endpoints with semi-competing risks

Yinghui Wei - University of Plymouth

Joint modelling of multiple primary outcomes in clinical trials with missing data

Victoria Vickerstaff - University College London, United Kingdom

Comparing methods of defining hyposmia in a large incident cohort of patients with Parkinson's disease

Sofia Kanavou - University of Bristol, United Kingdom

Assessment of alternate data-sources to meet the challenges of timelier and accurate registration of fact-of-death, as needed by record-linkage studies

Paula Curnow - NHS Digital

Optimisation using emulation in disease modelling. How to use potential improvements to identify new design points

Daria Semochkina - University of Southampton

Analysing time-to-event data with recurrent events

Christiana Kartsonaki - University of Oxford, United Kingdom

## Rapid Fire Talks 4

### Meeting Room 1A

Research and Application of Data Governance Architecture Based on Activity Theory

Huaihai Hui - Chinese Academy of Sciences / University of Leeds

Analysis of clickstream data

Ryan Jessop - Clicksco, United Kingdom

Remote fault detection: identify faulty refrigeration units using signal processing and machine learning on smart metering data

Phuong Pham - Centrica, United Kingdom

Data Science Education, Skills and Industry in Europe

Berthold Lausen - Department of Mathematical Sciences, University of Essex, United Kingdom

Adjusting reviewer scores for a fairer assessment via multi-faceted Rasch modelling

Caterina Constantinescu - The Data Lab, University of Edinburgh

The Use and Interpretation of Statistics in Medical Research: An Evaluation of Medical Students' Attitudes

Alaa Althubaiti - King Saud bin Abdulaziz University for Health Sciences, Saudi Arabia

Is there a curse of Aaron Ramsey?

Anthony Masters - Nationwide Building Society, United Kingdom

## Rapid Fire Talks 5

### Boardroom 1

A performance comparison between empirical variograms in achieving the best valid variogram

Esam Mahdi - Qatar University

Holistic approach to defining climate in ecological studies

Michel d. S. Mesquita - Bjerknæs Centre for Climate Research, Norway

Issues in earthquake modelling

Zak Varty - STOR-i Centre for Doctoral Training, United Kingdom

Generalized Regression Control Chart for Monitoring Crop Production in Nigeria using Asymmetric Distribution

Olatunji Arowolo - Lagos State Polytechnic, Ikorodu

Forecasting agricultural product and energy prices: A simulation-based model selection approach

Robert Kunst - Institute for Advanced Studies, Austria

Meta-analysis using simple methods successfully derives the big picture for exemptions of fisheries landing obligation

Mickael Teixeira Alves - Cefas, United Kingdom

The Impact of Agricultural Productivity on Economic Growth in Nigeria

Saheed Abidemi Agboluaje - The Polytechnic, Ibadan, Nigeria, Nigeria

Statistical Analysis of Genetic Relationship of Nigerian and Kenyan Sheep Populations

Asugha Kester Ugochukwu - Federal University of Agriculture, Abeokuta, Nigeria

# Day 2 Tuesday 3 September

## Rapid Fire Talks 6

### Boardroom 3B

Social Class and Language Mastery effect in Proficiency Tests

Kaizo Beltrao - EBAPE FGV

“Severity to those who confess?”: Evidence from China’s 6,876 Cases of Intentional Injuries

Mengjie Xu - Shandong University, Weihai

Does Job Insecurity Increase the Likelihood of Getting Married? Evidence from 2,123 Chinese Adults

Chaoying Fu - Shandong University, Weihai

Rethinking Reliability of Psycho-political Indicators in Women Elites for Multi-country Surveys

Rachel Gregory - University College Cork

Convergence and heterogeneity in global diets

Thai Le - Bournemouth University, United Kingdom

Population health in a digital age: the use of social media and wellbeing in Wales

Jiao Song - Public Health Wales, United Kingdom

The Dark Side of Community-level Social Capital: Does Civic Participation Hurt Mental Health in China?

Xiaoming Lin - Shandong University at Weihai

## Rapid Fire Talks 7

### Boardroom 2A

Admin data and public perception/views of how we use it

Neil Henderson - NISRA

Connected Open Government Statistics

Bill Roberts - Swirrl IT Limited, United Kingdom

Measuring the Economy - An ONS online book

Georgia Tasker-Davies - ONS

Faster Indicators of UK Economic Activity by using over a hundred million VAT returns

Luke Shaw - Office for National Statistics

Election prediction using financial models

John Fry - Manchester Metropolitan University, United Kingdom

Forecast Error: How to Predict an Election: Part 1: Polls

Timothy Martyn Hill - Barclays Corporate

Bad evidence encourages bad policy

Paul Marchant - Leeds Beckett University, United Kingdom

16:30 – 17:00

## Refreshments

Refreshment break

Hall 1C/D

17:00 – 17:50

## Keynote

**Keynote 3 – Significance ‘In Conversation’: Fighting fake news and false facts with evidence and statistical thinking**

Hall 1A

James Ball (Journalist and author) and Peter Cunliffe-Jones (Founder, Africa Check) in conversation with Timandra Harkness (Writer, broadcaster and presenter)

17:55 – 18:20

## Other

**Royal Statistical Society Awards Ceremony**

Hall 1A

Details of the award recipients can be found in the relevant insert at the back of the directory

All welcome

18:20 – 20:00

## Networking

**Awards & Poster Reception**

Hall 1C/D

Celebrate the success of the award winners and get your first chance to view this year’s poster presentations



# Day 3 Wednesday 4 September

Wednesday 4 September

08:30 – 09:00

Data Ethics

Contributed – Data Ethics: Breakfast Briefing

Meeting Room 3B

Organised by Tom King on behalf of the RSS Data Ethics Special Interest Group

Tom King will introduce the Data Ethics Day and the work of the Special Interest Group



09:00 – 10:00

Medical Statistics

4.1 Contributed – Medical Statistics: Survival Analysis

Meeting Room 3A

Is the Restricted Mean Survival Time Approach an Alternative to the Time-Dependent Cox Model When Hazards are Non-Proportional?

Bee-Choo Tai – National University of Singapore, Singapore

Landmark analyses of survival benefit associated with statin prescription

Ilyas Bakbergenuly – University of East Anglia, United Kingdom

Identifying biomarkers to predict pancreatic cancer

Christiana Kartsonaki – University of Oxford, United Kingdom

Official Statistics & Public Policy

4.2 Contributed – Official Statistics & Public Policy: Alternative data sources

Meeting Room 2A

Advancing the methods for administrative and transactional data in official statistics

Hannah Finselbach – Office for National Statistics, United Kingdom

Young People's Earnings Progression and Geographic Mobility

Bonang Lewis – Office for National Statistics, United Kingdom

Estimating the impact of automation

Andrea Lacey – Office for National Statistics, United Kingdom

Application of Statistics

4.3 Contributed – Applications of Statistics: Applications 1

Boardroom 1

Modelling Road Accidents in Edinburgh Using Hidden Markov Models

Valentin Popov – University of St Andrews, United Kingdom

Supervised Classification of Linear Synchronous Motor Vehicle State in a Smart Factory

Jill Daly – CIT

Dynamic Spatial Sampling in Semiconductor Manufacturing

Seán McLoone – Queen's University Belfast, United Kingdom

Social Statistics

4.4 Contributed – Social Statistics: Populations

Meeting Room 1B

Modelling and forecasting UK fertility using Bayesian Generalised Additive Models

Joanne Ellison – University of Southampton

Measurement Error Model to Correct the Inconsistencies in Migration Flow Data for South America

Andrea Aparicio-Castro – University of Manchester

Combining health information systems data and probability survey data to monitor health coverage indicators in low-resource settings

Caroline Jeffery – Liverpool School of Tropical Medicine, United Kingdom

Methods & Theory

4.5 Contributed – Methods & Theory: Methods Showcase

Hall 1A

Spaed rankings, and how to assess them – with application to predicting the Premier League

David Firth – University of Warwick, United Kingdom

Large numbers of explanatory variables

Heather Battey – Imperial College London, United Kingdom

Inference under unequal probability sampling with the Bayesian exponentially tilted empirical likelihood

Andrew Yiu – MRC Biostatistics Unit, United Kingdom



# Day 3 Wednesday 4 September

## Medical Statistics

### 4.6 Contributed – Medical Statistics: Identification and Prediction

#### Meeting Room 2B

Analysis of paediatric visual acuity using Bayesian copula models with sinh-arcsinh marginal densities  
**Mario Cortina Borja** – Great Ormond Street Institute of Child Health; University College London

Sample size requirements for validating risk prediction models for binary outcomes  
**Chen Qu** – UCL, United Kingdom

The use of period analysis techniques as an alternative approach to estimate post-transplant kidney survival outcomes

**Chloe Brown** – University of the West of England / NHS Blood and Transplant, United Kingdom

## Data Science

### 4.7 Contributed – Data Science: Misc

#### Meeting Room 1A

On Simulating Ultra High-Dimensional Multivariate Discrete Data  
**Alfred Schissler** – University of Nevada, Reno, United States

Big data and machine learning at the ONS: developing innovative temporal disaggregation techniques  
**Geoffrey Megardon** – Office for National Statistics

Performance of calibrated non-positive definite covariance matrix under a classification problem  
**Ronald Wesonga** – Department of Statistics, College of Science, Sultan Qaboos University, Oman

**Deloitte.**

## Environment & Spatial Statistics

### 4.9 Contributed – Environmental & Spatial Statistics: Climate

#### Boardroom 2

A new statistical approach to forecasting non-stationary climate indices  
**Philip Sansom** – University of Exeter

A bivariate spatiotemporal model to estimate the occurrence of ozone and PM10 emergency alerts in Mexico City  
**Eliane R. Rodrigues** – Universidad Nacional Autonoma de Mexico (UNAM)

Quantifying uncertainty in climate projections based on emergent constraints  
**Philip Sansom** – University of Exeter

## Professional Development

### PD3 Professional Development: Tweet all about it! A beginners' guide to Twitter for research

#### Hall 1B

Organised by Altea Lorenzo-Arribas on behalf of the Young Statisticians Section

With a growing interest in altmetrics and alternative measures of impact, researchers are increasingly being encouraged to self-promote and disseminate research on Twitter and other social media platforms. This session is an interactive, friendly, beginner's guide to Twitter, highlighting the benefits of this social media tool for researchers.

The session will begin with a beginner's guide to Twitter. We'll cover the basics, including a tour of the platform, introduce handles and hashtags, and show you how to follow your favourite statisticians.

Our second speaker will get you tweeting. With tips on how to make tweets more appealing with emojis, GIFs and photos, and advice on how to engage and grow your audience.

Our final speaker will focus on developing a Tweetorial; when and why you could do one, how to do it, and idea on how to get the discussion going.

## Professional Development

### PD4 Professional Development: Data ethics in practice

#### Meeting Room 3B

Organised by Tom King and Leone Wardman on behalf of the Data Ethics Special Interest Group

Ethical use of data has become a cliché, but what does this actually mean in practice? The ODI and DCMS have developed tools to help data scientists and other practitioners think through the ethical implications of their work. They each present a description of the tool and its evolution, covering applications within and between organisations which both have application in government and private sector. Participants should attend expecting to engage with the material and challenge their own practice. The talk will draw on exemplar applications and some walk-through activity in applying the tools to general examples. Delegates attending the session should expect to gain confidence in applying tools to their own projects and the kinds of issues that may arise.

#### Speakers:

**Miranda Marcus** – Open Data Institute  
**Joe Baddeley** – DCMS



# Day 3 Wednesday 4 September

## Keynote

### Keynote 4 – Barnett Lecture

10:10 – 11:00

#### Hall 1A

Data lakes from the data deluge – a digital environment vision

Marian Scott – Glasgow University, United Kingdom

11:00 – 11:20

### Special Presentation – 10 years of the Young Statisticians Section

#### Hall 1A

11:20 – 11:50

## Refreshments

Refreshment break

#### Hall 1C/D

11:50 – 13:10

## Medical Statistics

### 5.1 Medical Statistics: Precision Medicine

#### Meeting Room 3B

Organised by Laura Boyle on behalf of the RSS Medical Section

Dynamic modelling of single-case (n-of-1) data: challenges and novel applications

Rute Vieira – University of Aberdeen, United Kingdom

Robust joint modelling: a new approach to handle time-varying outlier impacts

Laura Boyle – The University of Adelaide, Australia

Methodological challenges for precision public health

David Wright – Queen's University Belfast, United Kingdom

Predicting disease progression in neurodegenerative diseases with high phenotypic variability

Frank Dondelinger – Lancaster University, United Kingdom

## Official Statistics & Public Policy

### 5.2 Official Statistics & Public Policy: Feeding the beast – Satisfying user demand for precision, timelines and speed!

#### Meeting Room 2A

Organised by Siobhan Carey on behalf of NISRA

How does a Government Statistical Agency respond to the challenge of developing and monitoring a societal wellbeing framework?

Niall O'Neill – NISRA

How NISRA has been informing EU Exit discussions

Chris Ganley – NISRA

Forecasting Emergency Care Occupancy

Eugene Mooney – NISRA

This session will show how official statisticians in NI have responded to specific requirements for timeliness of data, answering new questions in relation to exiting the EU and supporting policy colleagues adopting an outcomes-based approach with data at its heart who need to be able to say with confidence whether the dial is moving.

## Application of Statistics

### 5.3 Application of Statistics: Data in the NHS – facilitating quality improvement in healthcare

#### Boardroom 2

Organised by Bradley Manktelow on behalf of RSS Quality Improvement Section

Linked cluster-randomised trials of audit and feedback: A "split-block" design

Rebecca Walwyn – University of Leeds

Monitoring perinatal mortality in the UK

Bradley Manktelow – University of Leicester, United Kingdom

Quasi-Experimental designs for quality improvement research in Acute Ischemic Stroke Care

Abdel Douiri – King's College London, United Kingdom

Quantitative data play an increasingly important role in quality improvement and quality assurance within healthcare. This session will focus on examples of the practical application of statistical methods in healthcare to facilitate quality improvement, the potential benefits and the challenges to be overcome.

# Day 3 Wednesday 4 September

## Social Statistics

### 5.4 Social Statistics: Transforming population, migration and social statistics

#### Meeting Room 1B

Organised by Andy Teague on behalf of the Office for National Statistics

ONS is transforming the way we produce population, migration and social statistics. The current system is centred around the Census which is supplemented inter-censally with information from surveys and admin data. We have set ambitious targets to put administrative data at the core of our evidence on international migration and population by 2020 and will deliver a predominantly online census in 2021. The ambition is to deliver a fully transformed system for producing population and migration statistics by 2023. Work done between now and the delivery of outputs from the 2021 Census will pave the way and support the ambition that 'censuses after 2021 will be conducted using other sources of data'.

This session will cover research that ONS has carried out into the potential of admin data in supporting and delivering a new system that can offer more responsive, frequent and timely insights into our society. Large household surveys will be needed to support the admin data first approach both to help assess the quality of the administrative data and to fill in gaps that administrative data can't provide. The session will cover how ONS are transforming to an integrated survey framework including adopting an online first response strategy. The third presentation will provide a user perspective on our transformation journey.

#### Speakers:

Andy Teague and Ian O'Sullivan – Office for National Statistics

## Methods & Theory

### 5.5 Methods and Theory: Theoretical advances in experimental design

#### Meeting Room 2B

Organised by Heather Battey and Garima Priyadarshini – Imperial College London.

Construction of Blocked Factorial and Fractional Factorial Designs  
Janet Godolphin – University of Surrey, United Kingdom

Design and analysis of experiments testing for biodiversity  
R.A. Bailey – University of St Andrews, United Kingdom

The design of experiments concerns, inter alia, the method of assigning treatments to experimental units when the effects under investigation tend to be masked by haphazard variation outside the experimenter's control. The talks in this session are about the theory of experimental design for some modern scientific problems.

## Communicating & Teaching Statistics

### 5.6 Communicating & Teaching Statistics: Show me the stats

#### Meeting Room 3A

Organised by Marc Vandemeulebroecke – Novartis

Look at graphs  
Allan Reese – Independent consultant

Say one thing: numbers in the news  
Robert Cuffe – BBC

Show me the question  
Andrew Wright – Novartis

Chambers et al. (1983) claimed that "there is no single statistical tool that is as powerful as a well-chosen graph." Indeed, effective graphics at the core of exploring and understanding data, communicating results and conclusions, and supporting decision-making.

In one word, they enable statistical leadership. In this session, we explore different facets of statistical leadership and communication through the effective use of graphics.

## Data Science

### 5.7 Data Science: Professional Ethics in Data Science Speaker: Rob Mastrodomenico

#### Meeting Room 1A

Organised by Tom King and Andy Garrett on behalf of RSS Data Ethics Special Interest Group and RSS Data Science Section

How the ASA Ethical Guidelines for Statistical Practice comprise data science and "data ethics"

Rochelle Tractenberg – Georgetown University and the Collaborative for Research on Outcomes and Metrics, United States

Data Science: Professional Ethics in Data Science  
Leone Wardman – ONS

RSS Professional Affairs Committee

Big data presents new challenges for statisticians – data can be accessed directly without permissions. So professional responsibilities or ethical behaviour need to be established and ethical considerations need to be embedded within the workflow. Corporate codes and regulation play their part, but they may be outdated, while professionals also have a responsibility to society to do the right thing. Both the RSS and ASA have looked into this and the RSS DSS working party with IFoA will report its findings. The ASA produced a code in 2016 and since then has been working on materials to support statisticians put it into practice. This is an opportunity to discuss the professional implications on the practice of statisticians and data scientists.



**Deloitte.**

# Day 3 Wednesday 4 September

## Business, Industry & Finance

### 5.8 Business, Industry & Finance: Embedding Data Analytics in the Business Process

#### Boardroom 1

Organised by Neil Spencer on behalf of the RSS Business & Industrial Section

Using data to become a clearer, quicker and tougher regulator  
**Johanna Hutchinson** – The Pensions Regulator, United Kingdom

Uncertainty in real-world applications of AI  
**Dongho Kim** – PROWLER.io Limited, United Kingdom

IceCAM – the Iceberg Crop Adaptive Model – Minimising food waste by adapting growing programmes to the weather  
**Iain Flint** – G's Growers, United Kingdom

香港城市大學  
City University of Hong Kong  
專業 創新 胸懷全球  
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## Environment & Spatial Statistics

### 5.9 Environment & Spatial Statistics: Climate Change

#### Hall 1A

Organised by Phil Sansom on behalf of the RSS Environmental Statistics Section

Statistics for Heatwaves and Extreme Waves in a Changing Climate  
**Jonathan Tawn** – Lancaster University, United Kingdom

Bayesian Additive Regression Trees for palaeoclimate reconstruction  
**Andrew Parnell** – Maynooth University, Ireland

**Thordis Thorarinsdottir** – Norwegian Computing Center

## Professional Development

### PD5 Professional Development: Getting your work published and maximising its impact

#### Hall 1B

Organised by Emily Granger on behalf of the RSS Young Statisticians Section and Stephen Raywood on behalf of Wiley

Are you looking to get your work published? Or do you want to raise the profile of your published work? The session, jointly organised with Wiley, will provide valuable advice for writing journal and magazine articles, give an overview of article review processes, and explore available self-promotional tools to raise the visibility of your work or research.

**Speakers:** **Brian Tarran** – Editor, Significance, **Jouni Kuha** – Joint Editor, Journal of the Royal Statistical Society, Series A, **Stephen Raywood** – Senior Journals Publishing Manager, Wiley, **Beverley Harnett** – Senior Marketing Manager, Wiley

13:10 – 14:20

## Refreshments

### Lunch

#### Hall 1C/D

#### ONLY BY INVITATION

13:15pm – 14:15pm  
(in Organiser's Room on ground floor)

**Karen Facey** (RSS Honorary Officer for Sections and Local Groups) will meet with Section and Special Interest Group representatives for a discussion on current and future activities at the Society.

13:30 – 14:20

## Networking

### Poster viewing A

#### Hall 1C/D

Information about the poster presentations in this session can be found in the relevant insert at the back of the directory

14:20 – 15:40

## Medical Statistics

### 6.1 Medical Statistics: Bridging public understanding of health and data sharing

#### Meeting Room 3B

Organised by Tom King and Madeleine Murtagh on behalf of the RSS Data Ethics Special Interest Group

Communicating about patient data – some experience from Understanding Patient Data  
**Natalie Banner** – Understanding Patient Data

The patient imperative to 'use MY data'  
**Debbie Keatley** – use MY data

Socialising expertise: people-centred data governance of health information  
**Stephanie Mulrine** – Newcastle University



# Day 3 Wednesday 4 September

## Official Statistics & Public Policy

### 6.2 Official Statistics & Public Policy: Migrants, refugees, stateless and displaced people. Numbers, needs and impacts

#### Meeting Room 2A

Organised by Matthew Powell and Mary Strode on behalf of the RSS International Development and Official Statistics Sections

The world is witnessing a huge and growing population of refugees, the internally displaced (IDPs), migratory workers, and others with no settled abode. Measuring and monitoring these populations is a huge challenge engaging statisticians, human rights experts and policy professionals across the globe. Mary Strode is leading a small group of experts developing recommendations for measuring refugees and IDPs for the 2020 UN Statistical Commission and will present on:

- Controversies over who to count
- Statistical classifications & definitions, and the paradoxes they generate
- Estimated numbers
- Applying the new concepts in the UK and Europe

Mary's talk will be followed by a brief response from a legal perspective by Martina Caterina, legal adviser to the UN special rapporteur on the human rights of IDPs and from a statistical perspective by the IDS section and a general discussion.

## Application of Statistics

### 6.3 Applications of Statistics: Agricultural Statistics

#### Boardroom 1

Organised by Satyabrata Pal – formerly Indian Statistical Institute

#### Speakers:

Arunava Ghosh – Department of Agricultural Statistics, Uttar Banga Krishi Viswavidyalaya

Subhabaha Pal – Manipal Global Academy of Higher Education

## Methods & Theory

### 6.5 Methods & Theory: Statistical sparsity

#### Hall 1A

Organised by Heather Battey – Imperial College London

Overfitting correction in multivariate survival analysis  
Anthony Coolen – King's College London

Peter McCullagh – University of Chicago

## Communicating & Teaching Statistics

### 6.6 Communicating & Teaching Statistics: Can mathematics anxiety obstruct learning statistics in university students?

#### Meeting Room 2B

Organised by Meena Mehta Kotecha on behalf of RSS Education and Statistical Literacy Committee

An interactional and inclusive approach to enhancing students' engagement with statistics

Meena Mehta Kotecha – The London School of Economics and Political Science, United Kingdom

Are graduate students scared of statistics? Statistics Anxiety: barriers, enablers and policies

Carlos Fresneda-Portillo – Oxford Brookes University

How do medical students feel about statistics and data skills during a 10-week individual project and what support do they access?

Jamie Sergeant – University of Manchester, United Kingdom

# Day 3 Wednesday 4 September

## Data Science

### 6.7 Data Science: Ethical self-assessment: scrutiny doesn't have to be excruciating

#### Meeting Room 1A

Organised by Tom King and Leone Wardman on behalf of the RSS Data Ethics Special Interest Group

Ethical review is essential to the use of new data sources in data science but established statistical review is not always agile. The National Statistician's Data Ethics Advisory Committee and the ONS Data Science Campus have developed an ethics self-assessment tool to enable researchers to consider the ethics of their research at the research design phase thus helping to promote a culture of ethics by design. Simon Whitworth will present the tool, the background to it and the support and training available to help researchers apply the tool to their work. Peter Fullerton from the ONS Data Science Campus will explain how this is working in practice with some examples of how self-assessment is being applied. Madeleine Murtagh of METADAC will discuss the ethical implications of this new approach relating it to established and emerging ethical principles and practice.

#### Speakers:

Simon Whitworth – UK Statistics Authority  
Peter Fullerton – ONS Data Science Campus  
Madeleine Murtagh – Newcastle University



**Deloitte.**

## Business, Industry & Finance

### 6.8 Business, Industry & Finance: Predictive maintenance – algorithms and engineers

#### Meeting Room 1B

Organised by David Smallbone on behalf of RSS Business & Industrial Section

Predictive Maintenance is a hot topic in industry as organisations look to take advantage of 'intelligent infrastructure' and optimise allocation of their cost-constrained resources. The underlying challenges are statistical, the computational tools easily accessible, but essential insight is still trapped in the in minds of the ageing workforce. This session will explore real-world use cases to see how we can best combine the power of the algorithms and the knowledge of the engineers.

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## Professional Development

### PD6 Professional Development: Stats the way to write it!

#### Hall 1B

Organised by Lucy Teece and Brian Tarran on behalf of the RSS Young Statisticians Section and Significance Magazine

#### Speakers:

Robert Grant – author, BayesCamp  
Timandra Harkness – broadcaster and writer  
Rob Mastrodomenico – global sports statistics  
Rob Calver – CRC Press

Read any good stats books lately?

Ever thought about writing one yourself?

This session will explore the process of writing popular science/statistics books, from conception to publication.

Our panel, made up of published authors and publicists, will discuss what inspired them to write a book, give their top tips on getting started and how to keep going, and share their experiences.

The session will be of interest to attendees interested in writing for a wider audience and those with questions about how to get published.

## Professional Development

### PD7 Professional Development: Technical barriers that need consideration to allow real-time publishing of statistical data

#### Meeting Room 3A

Organised by Aine McGuire – The Sensible Code Company

Traditionally data such as census data have been released to the public as a series of static frequency tables. The tables are carefully designed to cover as broad a set of consumer user needs as possible whilst protecting confidentiality. Individuals and organisations may request additional tables, which can only be released if they meet confidentiality requirements.

There is a growing desire to release more data, and to make them available more rapidly. Some National Statistics Institutes are currently allowing online access to census data through flexible dissemination tools. The Office for National Statistics, UK is planning to release Census 2021 data in a similar way and it's currently testing TableBuilder from SensibleCode to make this possible.

# Day 3 Wednesday 4 September

Releasing tables in such a way raises a number of problems that must be addressed:

- Information Assurance issues e.g raw microdata must be held securely and protected against malicious actors.
- Data confidentiality must be ensured via Statistical Disclosure Control methods that balance disclosure risk against utility. The number of published tables can increase exponentially with a flexible dissemination system, and this can increase disclosure risk.
- The system has to be highly-performant to allow users to make real-time queries.

This session discusses these issues in detail and looks at some of the approaches that can be used to mitigate the risk.

15:40 – 16:10

## Refreshments

Refreshment Break

Hall 1C/D

16:10 – 17:10

## Medical Statistics

### 7.1 Contributed – Medical Statistics: Clinical Trials

#### Meeting Room 3B

Do mixed neuropathologies affect cognitive decline and possible Alzheimer's Disease Clinical Trial failure?  
**Sumali Bajaj** – Imperial College London, United Kingdom

Using Statistical Modeling to Identify the Useful Surrogate Outcomes in Critical Care Studies

**Rejina Verghis** – Queens University Belfast

Optimal treatment allocations in sequential multiple assignment randomized trial (SMART) design  
**Mirjam Moerbeek** – Utrecht University, Netherlands

## Official Statistics & Public Policy

### 7.2 Contributed – Official Statistics & Public Policy: Children's health and wellbeing

#### Meeting Room 2A

Predictors of Mental Disorders in Children. Analysis of the Mental Health of Children and Young People in England, 2017  
**Jodie Davis** – Office for National Statistics

Why are our children lonely? Findings from multivariate statistics and in-depth interviews with 10-15 year olds  
**Ellie Osborn** – Office for National Statistics

Understanding the histories of children in care and links to outcomes with longitudinal analysis  
**Cecilia Macintyre** – Scottish Government

## Medical Statistics

### 7.3 Contributed – Medical Statistics: Data Science I

#### Meeting Room 1A

Interpreting Clinical Narrative Diagnosis Models with Sentence Importance

**Mark Ormerod** – Queen's University Belfast, United Kingdom

A systematic review shows no performance benefit of machine learning over logistic regression for clinical prediction models

**Evangelia Christodoulou** – KU Leuven, Belgium

Applying Statistical Learning to Nuclear Magnetic Resonance Metabolic Profiling to Predict Spontaneous Preterm Birth  
**Juhi Gupta** – University of Liverpool

## Prize winners

### 7.4 RSS Prize Winners: Statistical Excellence Award for Early Career Writing 2019

#### Meeting Room 3A

The flying bomb and the actuary  
**Luke Shaw** – Office for National Statistics

A story about a tiny bot  
**Marco Antonio Andrade Barrera** – National Autonomous University of Mexico

Polarisation and the popular vote in Switzerland  
**Maximilian Aigner** – Université de Lausanne

A special session in which the three finalists for the Statistical Excellence Award for Early Career Writing 2019 will deliver presentations based on their articles.

# Day 3 Wednesday 4 Sept

## Methods & Theory

### 7.5 Contributed – Methods & Theory: Survival Analysis I

#### Meeting Room 2B

On a Simple Estimation of the Proportional Odds Model under Right Truncation

On generalizing Banks' smoothed bootstrap method for right-censored data

**Tahani Coolen-Maturi** – Durham University, United Kingdom

Goodness-of-fit tests for the cure rate in a mixture cure model

**Ursula U. Mueller** – Texas A&M University

## Communicating & Teaching Statistics

### 7.6 Contributed – Communicating & Teaching Statistics

#### Hall 1B

Insightful Analytics – surreptitiously adding thoughtful Statistics to the glamour of Data Science

**Neil Spencer** – University of Hertfordshire

Principles of statistical visualisation for public policy audiences: learning lessons from the past

**Thomas King** – United Kingdom

Civic Statistics: Big Ideas, Needs and Challenges.

Why we need a new subdiscipline

**Joachim Engel** – Ludwigsburg University of Education, Germany

## Data Ethics

### 7.7 Contributed – Data Ethics

#### Hall 1A

The Minority Report: Fairness and Explainability in Machine Learning

**Stuart Millar** – Centre for Secure Information Technologies, Queen's University Belfast, United Kingdom

Data ethics in a changing and challenging global context

**Peter Elias** – Warwick University

The future of privacy and confidentiality methods

**James Tucker** – Office for National Statistics



## Business, Industry & Finance

### 7.8 Contributed – Business, Industry & Finance: Forecasting currency rates and stock market indices

#### Meeting Room 1B

Forecasting Cryptocurrencies Volatility with NonGaussian Garch Models

**Massimiliano Giacalone** – University of Naples "Federico II"

Dynamic functional time series forecasting of foreign exchange implied volatility surfaces

**Han Lin Shang** – Australian National University, Australia

Forecasting Risk Measures Using Intraday Data in a Generalized Autoregressive Score (GAS) Framework

**Xiaohan Xue** – ICMA Centre,

Henley Business School,

University of Reading



## Environment & Spatial Statistics

### 7.9 Contributed – Environment & Spatial Statistics: Health Factors

#### Boardroom 1

Simulating disease control strategies for Bovine Tuberculosis (bTB) in Northern Ireland

**Emma Brown** – Queen's University Belfast, United Kingdom

Investigating the importance of environmental factors to understand renal disease attributed to uncertain aetiology

**Jennifer McKinley** – Queen's University Belfast, United Kingdom

Area interaction point processes for bivariate point patterns in a Bayesian context

**Glenna Nightingale** – University of Edinburgh, United Kingdom

17:20 – 19:20

## Keynote

### Keynote 5: Discussion Meeting – Signs and sizes: understanding and replicating statistical findings

#### Hall 1A

A new standard for the analysis and design of replication studies

**Leonhard Held** – University of Zurich

Knowing the signs: a direct and generalizable motivation of two-sided tests

**Kenneth Rice** – University of Washington, Seattle,

**Tyler Bonnett** – National Laboratory for Cancer Research,

**Frederick and Chloe Krakauer** – University of Washington



Day 3 Wednesday 4 Sept



# Pub Quiz Night

Wednesday 4th September  
from 8.00pm

## All welcome!

Come and enjoy a few drinks with fellow attendees and join in with our general knowledge quiz.

**Free drink on arrival.**  
**Food can be ordered.**

Teams will be arranged on the night – arrive by **8.30pm** to register a team.

**Venue:** Granny Annies,  
81 Chichester Street,  
Belfast BT1 4JE

Event organised by the  
**RSS Young Statisticians Section**



# Day 4 Thursday 5 September

Thursday 5 September  
09:00 – 10:00

## Medical Statistics

### 8.1 Contributed – Medical Statistics: Treatments and Interventions

#### Meeting Room 3B

Optimum weighting schemes when performing Matching-Adjusted Indirect Comparisons

**Dan Jackson** – AstraZeneca, United Kingdom

Efficient Computation for Evaluation and Comparison of Phase I Oncology Study Designs

**Jun Takeda** – Astellas Pharma Inc., Japan

Graphical representation and comparison of attributable fractions across multiple disease risk factors

**John Ferguson** – NUI Galway, Ireland

## Official Statistics & Public Policy

### 8.2 Contributed – Official Statistics & Public Policy: Capturing inequality

#### Meeting Room 2A

Improving Public Confidence in Gender Pay Gap Reporting – An Overview of the RSS's Recommendations

**Nigel Marriott** – Marriott Statistical Consulting Ltd, United Kingdom

Statistics to Ensure Welfare for Ethnic Minorities

**Kevin Johansen** – Norway

Using tax data to better capture top earners in household income inequality statistics

**Martin Shine** – Office for National Statistics

## Applications of Statistics

### 8.3 Contributed – Applications of Statistics: Applications on animals and plants

#### Boardroom 2

A Bayesian analysis of animal movement data

**Colin Gillespie** – Newcastle University

An application of covariate-based constrained randomisation in livestock research

**Andrew Mead** – Rothamsted Research, United Kingdom

Predicting Temporal Mutant-Treated Arabidopsis Thaliana Gene Expressions

**Susana Conde** – The University of Warwick, United Kingdom

## Medical Statistics

### 8.4 Contributed – Medical Statistics: Data Science II

#### Meeting Room 1A

Predicting severe complications after cardiac surgery: methods and challenges

**Linda Lapp** – University of Strathclyde, United Kingdom

Uncertainty in Diagnostic Testing without Gold Standards

**Nicholas Gray** – University of Liverpool, United Kingdom

Spatial statistical modelling of retinal images from patients with diabetic macular oedema

**Wenyue Zhu** – University of Liverpool, United Kingdom

## Methods & Theory

### 8.5 Contributed – Methods & Theory: Survival Analysis II

#### Meeting Room 2B

Empirical likelihood comparison of t-year absolute risks

**Paul Blanche** – Department of Biostatistics, University of Copenhagen, Denmark

Fast Bayesian hazard regression under general censoring via monotone p-splines

**Matthias Kaeding** – RWI - Leibniz Institute for Economic Research

Regularised survival analysis of lung cancer patient outcome using radiotherapy dose data

**Elizabeth Buckingham-Jeffery** – University of Manchester & Highways England

## Methods & Theory

### 8.6 Contributed – Methods & Theory: Time Series

#### Hall 1A

Nonparametric clustering for spatio-temporal datasets

**Ashwini Venkatasubramaniam** – The Alan Turing Institute, United Kingdom

Estimation of the effect lag of predictors in modelling temporal datasets with application the effect of lifestyle and air quality on health outcomes in Leeds

**Jeanine Houwing-Duistermaat** – University of Leeds, United Kingdom

Model averaging of integer-valued autoregressive model with covariates

**Jiajing Sun** – University of Chinese Academy of Sciences, China

# Day 4 Thursday 5 September

## Medical Statistics

### 8.7 Contributed – Medical Statistics: Estimation and Performance

#### Meeting Room 3A

Survival analysis of cancer patient based on their Genome profile  
**Khaled Mubarek** – Prince Sattam bin Abdulaziz University

Assessing performance of survival risk prediction models: A review of traditional and modern methods  
**David McLernon** – University of Aberdeen, United Kingdom

Estimation of proportions by group retesting  
**Stephen Walter** – McMaster University, Canada

## Prize Winners

### 8.8 RSS Prize Winners: Best presentations from YSM 2019

#### Meeting Room 1B

In need of some simulation: the Monte Carlo method for sample size calculations  
**Nick Beckley-Hoelscher** – KCL

Relaxing the constant hazard assumption in a multi-state model in hospital epidemiology  
**Micki Hill** – University of Leicester

Calculating Avoidable Deaths for Cancer Patient Survival  
**Jamie Stokes** – University of Oxford

Come and hear the winning presentations from the Young Statisticians Meeting 2019 which took place in Leeds 31 July – 1 August

## Business, Industry & Finance

### 8.9 Contributed – Business, Industry & Finance: Applying statistics to improve industry

#### Boardroom 1

Predicting the number of resources required to ensure 97% of the time emergencies are reached in 1 hour  
**Laura Thornley** – Northern Gas Networks

A new link function to analyze the launch of technological products  
**Gloria Gheno** – Innovative data analysis, Italy

Enhancing our understanding of hazard perception in driving  
**Sritika Chowdhury** – Transport Research Laboratory

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## Professional Development

### PD8 Professional Development: Pre-plenary Overview Meeting

#### Hall 1B

Organised by Gareth McCray on behalf of the Young Statisticians Section

A very short introduction to hypergraph data  
**Simon Lunagomez Coria** – Lancaster University, United Kingdom

This session will give an introduction to the topics to be covered in the Methodological keynote talk (Keynote 6) and enable young statisticians (and those less familiar with the topic) to better understand the session to follow.

10:10 – 11:00

## Keynote

**Keynote 6: Bayesian Categorical Matrix Factorization via Double Feature Allocation**

### Hall 1A

Peter Mueller –UT Austin

11:00 – 11:30

## Refreshments

**Refreshment Break**

Hall 1C/D

# Day 4 Thursday 5 September

11:30 – 12:50

## Medical Statistics

**9.1 Medical Statistics: The Northern Ireland Clinical Trials Unit (NICTU) and the SANDWICH Trial**

### Meeting Room 3A

Organised by Cliona McDowell, Northern Ireland Clinical Trials Unit (NICTU)

Sedation AND Weaning in Children (SANDWICH) and the need for clinical trial

**Bronagh Blackwood** – QUB

Stepped Wedge Trial Design and analysis methods for the SANDWICH trial

**Cliona McDowell** – NICTU

Adherence to the weaning protocol

**Margaret Murray** – NICTU

The role of the CTU and the study statistician

**Evie Gardner** – NICTU

## Official Statistics & Public Policy

**9.2 Official Statistics & Public Policy: Transforming GDP**

### Boardroom 2

Organised by Emma Howley on behalf of Office for National Statistics (ONS)

In Blue Book 2019, Office for National Statistics (ONS) will introduce a new framework to produce GDP. This new framework will confront current price and volume GDP using the Supply and Use Tables (SUTs) framework. Historically the SUT framework has been used to set the current price level of UK GDP, but we have extended its application as the basis for volume GDP.

This session will include a series of short presentations providing details of how ONS has delivered this, including an overview of work to improve source data; details on how the theory of the framework was operationalised within the core accounts; an outline of the utilisation of optimisation techniques to reconcile GDP estimates and an overview of the next steps in the transformation journey.

#### Speakers:

Lee Birt

Ben Graham

Adriano Lo Presti

## Applications of Statistics

**9.3 Applications of Statistics: Summer of sports panel**

### Meeting Room 2A

Organised by Rob Mastrodomenico on behalf of the RSS Statistics in Sport Section

2019 has some huge sporting events including the Cricket World cup and the Rugby World Cup. This panel session will comprise of a number of statistical experts discussing various data and statistical topics relating to the events.

## Social Statistics

**9.4 Social Statistics: Old dogs' new tricks: respondent centred approach to mixed mode social survey redesign at ONS**

### Meeting Room 1B

Organised by Rob Doherty and Ian O'Sullivan on behalf of Social Surveys Transformation Research and Design team, ONS

A respondent centred approach – Questionnaire content redesign for a mixed-mode Labour Market Survey  
**Vicky Cummings** – Office for National Statistics

A respondent centred approach – Social survey materials and respondent engagement strategies for mixed mode collection  
**Tara McNeill** – Office for National Statistics

Findings and evidence from large-scale mixed mode testing of transformed social surveys  
**Colin Beavan-Seymour** – Office for National Statistics

# Day 4 Thursday 5 September

## Methods & Theory

### 9.5 Methods & Theory: Multi-Parameter Regression Survival Modelling

#### Meeting Room 2B

Organised by Gilbert MacKenzie – University of Limerick

Penalised Variable Selection in Multi-Parameter Regression Survival Modelling

**Fatima Jaouimaa** – University of Limerick, Ireland

A Multi-parameter regression model for interval censored survival data

**Defen Peng** – ICVHealth/CHEOS, Canada

Semi-Parametric Multi-Parameter Regression Survival Modelling

**Kevin Burke** – University of Limerick, Ireland

This Workshop traces the development of MPR models as alternatives to Cox models (Burke & MacKenzie, Biometrics, 2017) and describes the most recent developments in this rapidly expanding field.

There will be a short panel discussion at the end of the Workshop.

## Communicating & Teaching Statistics

### 9.6 Communicating & Teaching Statistics: STEM Showcase

#### Hall 1B

Organised by Laura Bonnett and Simon White on behalf of RSS Education & Statistical Literacy Hands-on Statistics Sub-Group and the RSS Young Statisticians Section

The session will present examples of engaging statistical activities that have been developed, tested and successfully used in schools and at science festivals to inspire the next generation of statisticians. It will be relevant to new and experienced STEM ambassadors and/or statisticians volunteering in schools or with the general public.

#### Speakers:

**Jennifer Rogers** – William Guy Lecturer

**Rejina Verghis** – Belfast-based statistical STEM Ambassador

**Simon White** – RSS Education & Statistical Literacy Hands-on Statistics Sub-Group representative

## Data Ethics

### 9.7 Data Ethics: The Data Ethics Landscape

#### Hall 1A

Organised by Tom King and Cathal Walsh on behalf of the RSS Data Ethics Special Interest Group

The RSS Data Manifesto started to campaign for a 'council for data ethics' early in 2016. Now we have what we wanted, with an international-oriented convention in the Ada Lovelace Institute and independent oversight from the government Centre for Data Ethics and Innovation. But what do they mean by 'data' and where does this leave the RSS? Can statistical fundamentals be crowded out by the enthusiasm for AI? The new RSS Special Interest Group (SIG) has mapped the landscape and sees some gaps and potential. We have a strong international fellowship and reputation – how should we focus our influence and effort?

#### Panel will include:

**Peter Elias** – Chair, RSS Data Ethics Special Interest Group

**Carly Kind** – Ada Lovelace Institute

**Rochelle Tractenberg** – Georgetown University and the Collaborative for Research on Outcomes and Metrics, United States



## Business, Industry & Finance

### 9.8 Business, Industry & Finance: Professional best practice for data science in industry

#### Meeting Room 1A

Organised by Leone Wardman and Rich Pugh on behalf of the RSS Data Science Section

The Data Science Section will present their outputs for 2019 on best practice in industry when using data science. This will focus on one or two industries to showcase examples and case studies of best practice, including guiding principles and practical steps / methods / tools to implement these. This will be a professional development type session which aims to provide practical tools and guidance to achieve best practice when applying data science within the showcased industries – as well as more broadly within data science.

#### Speakers:

**Leone Wardman** – Office for National Statistics and RSS Data Science Section

**Rich Pugh** – Mango Solutions and RSS Data Science Section

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## Methods & Theory

### 9.9 Methods & Theory: Statistical analysis of relational data

#### Meeting Room 3B

Organised by Simon Lunagomez – Lancaster University

Identifying potentially overlapping communities from two-mode networks

**Veronica Vinciotti** – Brunel University London, United Kingdom

A network approach to votes exchange in the Eurovision Song Contest

**Silvia D'Angelo** – University College Dublin, Ireland

Methods of analysing and comparing networks

**Sofia Olhede** – EPFL & UCL, United Kingdom

Latent Space Representations of Hypergraphs

**Kathryn Turnbull** – Lancaster University, United Kingdom

Relational data poses interesting and unique challenges for statisticians. Despite the vast literature on the subject, some of these challenges remain at the frontier of statistical science research. These include: the search for canonical representation of networks, the modelling of hypergraph data, inference for multiple network data, the development of interpretable models for high-dimensional partially-observed networks.

## Professional Development

### PD9 Professional development: Helping students develop data workflows and reproducible research

#### Boardroom 1

Organised and presented by Adam J Sullivan – Brown University

In a great deal of statistical methods, we employ the Central Limit Theorem which we assume to be true if we replicated our research over and over again. In the traditional research world, this assumption was made but rarely was there a way to truly replicate work.

The world of Data Science changes this paradigm. All areas of work from business to health care collect more types of data on a more regular basis. This should lend us the ability to reproduce results and test our assumptions. How do we adequately set up a data workflow to allow for things to be more reproducible? How do we encourage sharing of findings and code so that others in our fields or companies can replicate and reproduce our work?

This presentation will discuss many strategies to create reproducible research, both from the lense of a researcher preparing their data workflow to allow them to reproduce but for how to we teach these methods to students.

We will look further into tools like RStudio, RCloud Social, Jupyterhub and Github. All provide platforms for sharing and collaborating on projects while making reproducible research easy to employ.

**12:50 – 14:00**

## Refreshments

Lunch

Hall 1C/D

## ONLY BY INVITATION

13:00 – 14:00

(in Organiser's Room on ground floor)

**Karen Facey** (RSS Honorary Officer for Sections and Local Groups) will meet with Local Group representatives for a discussion on current and future activities at the Society.

13:10 – 14:00

## Networking

### Poster viewing B

### Hall 1C/D

Information about the poster presentations in this session can be found in the relevant insert at the back of the directory.

14:00 – 15:00

## Medical Statistics

### 10.1 Contributed – Medical Statistics: Meta-analysis

#### Hall 1A

Synthesis of individual and aggregate level data using multilevel network meta-regression: extension to general likelihoods

**David Phillippo** – University of Bristol, United Kingdom

An extended mixed-effects framework for meta-analysis

**Francesco Sera** – London School of Hygiene and Tropical Medicine, United Kingdom

On the comparison of alternative models in dose-response meta-analysis using summarized data

**Nicola Orsini** – Department of Public Health Sciences, Karolinska Institutet

## Official Statistics & Public Policy

### 10.2 Contributed – Official Statistics & Public Policy: Business and migration

#### Meeting Room 2A

How are services traded internationally? UK developments measuring the trade in services by modes of supply

**Daniel Cheung** – Office for National Statistics, United Kingdom

Using linked administrative data to better understand the activity and contributions of international migrants within the UK

**Megan Bowers** – Office for National Statistics, United Kingdom

Design strategy for data collection in business surveys to reduce response bias

**Dominic Brown** – Office for National Statistics, United Kingdom

## Applications of Statistics

### 10.3 Contributed – Applications of Statistics: Applications 2

#### Boardroom 2

Probability reasoning in judicial fact-finding

**Ian Hunt** – Monash University

Judging a book by its cover – How much of REF 'research quality' is really 'journal reputation'?

**David Selby** – University of Warwick, United Kingdom

Bayesian networks and chain event graphs as decision making tools in forensic science

**Gail Robertson** – University of Edinburgh, United Kingdom

## Social Statistics

### 10.4 Contributed – Social Statistics: Response Data

#### Meeting Room 1B

Response rates, fieldwork and survey quality: Does reissuing reduce non-response bias?

**Linda Hutcheson** – Ipsos MORI

Administrative Data and its use to combat survey Non-Response

**Matthew Moore** – University of Stirling, United Kingdom

On reproducibility of hypothesis tests based on randomised response data

**Fatimah Alghamdi** – Durham University, United Kingdom

## Methods & Theory

### 10.5 Contributed – Methods & Theory: High-Dimensional Data

#### Meeting Room 2B

A novel method for analysis of high dimensional data

**Reza Drikvandi** – Manchester Metropolitan University, United Kingdom

Refining clustered standard errors with few clusters

**Gianmaria Niccodemi** – University of Groningen, Italy

Bias reduction methods for binary regression with misclassified responses

**Euloge Clovis Kenne Pagui** – Department of Statistics, University of Padoua, Italy

# Day 4 Thursday 5 September

## Data Science

### 10.6 Contributed – Data Science: Machine Learning

#### Meeting Room 1A

Rage Against The Machine – The limits of machine learning for automatic product classification

Jens Mehrhoff – European Commission, Luxembourg

Predicting Human States with Multimodal data utilising Machine Learning Methodologies

Daniel Moore – Queen’s University Belfast

Treating missing data with machine learning

Vinayak Anand Kumar – Office for National Statistics



## Medical Statistics

### 10.7 Contributed – Medical Statistics: Hospital Outcomes

#### Meeting Room 3B

So, you’ve been added to the lung transplant list, now what? An analysis of patient outcomes from listing for a lung transplant

Rachel Hogg – NHS Blood and Transplant, United Kingdom

Using funnel plots and CUSUM techniques to monitor hospital-standardised mortality

Chris Mainey – University Hospitals Birmingham NHS Foundation Trust

“Tell us what the data say”: Understanding and misunderstanding control charts for monitoring hospital outcomes

Peter Martin – University College London, United Kingdom

## Prize Winners

### 10.8 RSS Prize Winners: Best presentations from RSC 2019

#### Meeting Room 3A

Analysis of clickstream data

Ryan Jessop – Clicksco, United Kingdom

Improving the Emulation of Stochastic Computer Models

Evan Baker – University of Exeter

Uncertainty Quantification for Offshore Wind Energy

Jack Kennedy – Newcastle University

Come and hear the winning presentations from the Research Students Conference 2019 which took place in Exeter in June 2019

14:00 – 16:50

Please note this workshop spans two sessions

## Data Science

### 10.9/11.9 Contributed – Data Science: Version control for statistics

#### Hall 1B

Organised by Giacomo Peru on behalf of The Software Sustainability Institute

Version Control is a fundamental tool for anyone wanting to apply good software practices to their code, including researchers who use statistics as part of their set of work tools. Version Control is crucial for the reproducibility of research results. Keeping provenance of your code and data – what changes did you make? when did you make them? why did you make them? A source revision control, like git or mercurial, can help you with this. Furthermore, you can tag the version of the code and data so that if at any point you publish them, you can recover the state of the system at the time.

This workshop will walk you through the basics so that you will be able to use git to improve your process for reproducibility.

#### Presenters:

Giacomo Peru – University of Edinburgh

Mario Antonioletti – University of Edinburgh



## Professional Development

### PD10 Professional Development: Get Involved!

#### Boardroom 1

Organised by Beatriz Goulao on behalf of the Young Statisticians Section

Join us to find out how statisticians of all ages (from the young to the most experienced) have been volunteering for the RSS and associated initiatives and how you may be able to get involved.

#### Speakers will include:

Amaka Nwagbara – RSS Membership Engagement Manager

15:00 – 15:30

## Refreshments

Refreshment break

#### Hall 1C/D



# Day 4 Thursday 5 September

15:30 – 16:50

## Medical statistics

### 11.1 Medical Statistics: The latest methodological developments in network meta-analysis

#### Meeting Room 3B

Organised by Joy Leahy and Sarah Nevitt

Individual Patient Data in a Network Meta Analysis:  
Is it worth the effort?

**Cathal Walsh** – University of Limerick

Network meta-analysis of joint longitudinal and time-to-event data

**Maria Sudell** – University of Liverpool, United Kingdom

Reference prediction to connect evidence networks

**Howard Thom** – University of Bristol, United Kingdom

Network Meta-Analysis (NMA) is a powerful tool for ranking interventions and medical decision making where there are more than two interventions of interest. Traditionally, NMA combines aggregate data from randomised controlled trials. In recent years, additional methods have been developed to augment this approach, such as by incorporating individual patient data where available, or including additional non-randomised evidence.

This session will present a number of recent developments in NMA. There will also be a panel discussion at the end of the session where the speakers discuss the new methods and NMA methods in general.

## Official Statistics & Public Policy

### 11.2 Official Statistics & Public Policy: Developments in regional economic statistics

#### Meeting Room 2A

Organised by James Scruton on behalf of Office for National Statistics

Increasing devolution of powers to cities and regions in the UK brings with it increasing demand for regional and local statistics to monitor the economy at a sub-national level. The Bean Review made various recommendations on the need for regional economic statistics in the face of growing devolution:

- A need for more timely regional statistics
- A need for greater flexibility to provide statistics for different geographic areas
- More use of administrative data sources in regional statistics

In response, several new regional economic measures have been developed by ONS, and the most significant of these will be covered in this session.

On 5th September 2019 ONS will be taking the ambitious step of publishing quarterly GDP estimates for the countries and regions of the UK for the first time. The first part of this presentation will outline how ONS has developed these estimates using emerging technology and data sources, and future work that ONS has planned to provide estimates at a lower geographic level.

The second section of this presentation will detail the development of regional household expenditure, the new outputs that will be produced as part of it, and the benefits that this measure will bring to users.

This final part of this presentation will report on work funded by the ONS through the Economic Statistics Centre of Excellence to use 'nowcasting' methods to produce early estimates of regional economic growth to approximately the same timetable as the UK release of quarterly GDP.

We will also look at some of the new insights that these data can shed on the regional economies of the UK.

#### Speakers:

Molly O'Donnell – ONS

Trevor Fenton – ONS

Stuart McIntyre – University of Strathclyde

## Social Statistics

### 11.4 Social Statistics: Could I ask you about your life? Future-proofing household surveys

#### Meeting Room 1B

Organised by Sarah Martin, Head of Surveys,  
Scottish Government on behalf of Cross-Government  
Surveys Group

Scottish Government Population Surveys and Core Questions

**Ben Cook** – Scottish Government

Welsh Government National Survey – an example of a merged survey

**Steven Marshall** – Welsh Government

Social Surveys in Northern Ireland – past, present and future

**Kevin Sweeney** – Northern Ireland Statistics & Research Agency

The last decade has seen great changes in funding and participation in household surveys, while digital innovation provides new opportunities for transformation. In this session we will illustrate the changing landscape for social household surveys and highlight three methodological innovations from different parts of the UK that enable us to do more with less. Bringing together the heads of surveys/research from NISRA, Scottish Government and Welsh Government, we will discuss challenges, opportunities and what the future holds. The audience will join us as advisors in a facilitated discussion on how we will continue to meet demand for robust lifestyle, attitudes and perceptions evidence using statistical innovation.

# Day 4 Thursday 5 September

## Methods & Theory

### 11.5 Methods & Theory: Inferential Machine Learning – Accelerating Statistical Methodology through ML

#### Hall 1A

Organised by **Seth Flaxman** – Imperial College London

RKHS-based tests for Survival Analysis

**Tamara Fernandez** – University College London, United Kingdom

Using variational autoencoders to learn efficiently embedded representations of functions and their properties

**Swapnil Mishra** – Imperial College London, United Kingdom

A unified machine learning approach to time series forecasting applied to emergency department demand

**Michaela Vollmer** – Imperial College London, United Kingdom

Automatic Differentiation: Inverse Accumulation Mode

**Barak Pearlmutter** – Maynooth University, Ireland

Machine learning (ML) methods have found widespread application in a number of mathematical and scientific areas. This panel will focus on the potential of ML methods to transform the discipline of statistics itself, especially statistical methodology, by bringing the algorithmic perspective to bear on difficult statistical problems, and highlighting the use of new computational methods to scale-up statistical inference.

## Communicating & Teaching Statistics

### 11.6 Communicating & Teaching Statistics: Do we need a Q-Step initiative for statistics training in biology, medicine and health?

#### Meeting Room 1A

Organised by **Jamie Sergeant** on behalf of RSS Education and Statistical Literacy Committee

Adapting the Q-step scheme for use in undergraduate Medicine: What would we need to do?

**Margaret MacDougall** – University of Edinburgh, United Kingdom

How could we design a Q-Step initiative for biology, medicine and health?

**Jamie Sergeant** – University of Manchester, United Kingdom

The Q-Step experience: what, why and how?

The Q-Step programme was set up in 2013 to deliver a step-change in quantitative social science training, addressing a lack of quantitative skills among UK social science graduates. This session will consider whether we need a similar initiative in biological, medical and health sciences to ensure that practitioners, researchers and educators are suitably equipped to engage in robust science and safe clinical decision making and to navigate the healthcare data revolution. We will consider current practice in statistics education, what we can learn from the Q-Step experience and how delegates would shape a new initiative in biology, medicine and health.

## Communicating & Teaching Statistics

### 11.8 Communicating & Teaching Statistics: Stats into stories – the key ingredients of collaboration, from post-it notes, to blank slates, springs and Haribo

#### Meeting Room 3A

Organised by **Darren Waters** on behalf of Office for National Statistics

The session will give an overview of how the ONS has worked across the organisation using statisticians, data vis experts, data journalists, designers and social media to create impactful and innovative stories aimed at a wide audience.

What have we learned from 3 years of working collaboratively inside an organisation which feels most comfortable with data sets and descriptive statistics?

The session will culminate in a mini-workshop to turn some statistics into initial story ideas.

#### Speakers:

**Callum Thomson** and **Rob Fry** – Office for National Statistics

# Day 4 Thursday 5 September

17:00 – 17:50

## Keynote

Keynote 7 – What we need and what we don't

Hall 1A

### Speaker:

Anthony Reuben – BBC Reality Check

Anthony has written a book called "Statistical", based largely on his years of sitting in newsrooms receiving number-based press releases of varying robustness. Hear what he found out and what it can tell you about how you engage with journalists and the public.

17:50 – 18:00

## Keynote

Close of Conference

Hall 1A

19:30 – 23:30

## Networking

Conference Dinner

Titanic Belfast

Welcome drinks from 7.30pm with dinner served from 8.15pm

## NOMINATIONS ARE NOW OPEN

### STATISTICS OF THE YEAR

2019

Visit: [rss.org.uk/statsoftheyear](https://rss.org.uk/statsoftheyear)

RSS

### STATISTICS OF THE DECADE

2010-2019

Do you know a UK or international statistic that provides a real insight into this year? Or is there a figure which encapsulates the past decade, 2010-19? If so, please put forward your ideas for the RSS 'Statistics of the Year 2019' and 'Statistics of the Decade' awards!

**Deadline: Sunday 24th November 2019**





# Do you want to

- develop your career?
- gain formal recognition for your skills and experience?
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- find out more about joining a community of over 10,000 data professionals worldwide?

If so, visit the **RSS stand** in the exhibition area to find out how we can help you.



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## RSS Staff and stewards

Paul Gentry (Conference Manager), Luz Martinez (Conference Officer) Joanna Ratajczak (registration manager), Kamila Buczek (web & filming), Mawreen Chapman (presentations coordinator), Brian Tarran (podcasting & reporting), Sara McDonnell (reporting & social media), Mags Wiley, Judith Shorten (Discussion Meeting), Stuart McKendrick, Atrima Khastgir and fellow staff at the Royal Statistical Society.

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