

THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

JUNE 2015 NO 534



SEEING THE TREES FOR THE WOOD

:: INSIDE THIS MONTH :: :: :: ::

BUTTERFLIES IN THE CHEST

GRAND CHALLENGES FOR O.R.

CUBAN HEALS?

THE RISE AND RISE OF SOCIAL MEDIA



THE OR SOCIETY

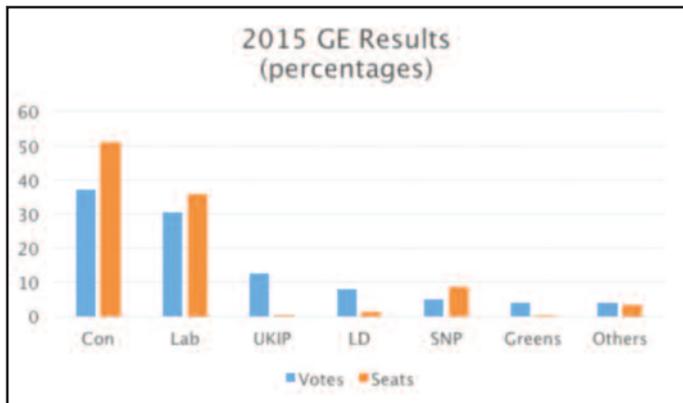
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EDITORIAL

JOHN CROCKER

I suppose the biggest event, at least for those readers living in the UK, is that we have just had a General Election in which the Conservative Party was returned with 331 (out of 650 or 50.9%) seats thus giving them an overall majority. Although the exit polls were pretty close, very few, if any, of the pre-election polls suggested this would be the case and, indeed, if one looks purely at the numbers of votes cast, it is hard to see how we ended up with this result.



Surely there is a fairer system! Charles ‘Lewis Carroll’ Dodgson well over a century ago put forward some strong arguments but I guess they were too radical for the time (or possibly they were unlikely to favour the ruling party, not that politicians are in any way swayed by self-interest, of course)!

Another important, and hopefully longer-lasting event was the launch of our latest publication *IMPACT*, copies of which you should already have received. In fact, one of the articles is about opinion polls. Maybe the next issue will include something about ‘fairer’ systems.

As always, the animal kingdom is showing us how things should be done – this month the emphasis is on soldier ants. And talking about social creatures, Louise’s (Y2OR) article is all about social media which leads nicely on to our latest regular feature – the social media page covering aspects of O.R. and Analytics currently being discussed.

Another of our [almost] regular features is ‘first projects’. This month, you can read all about how Brian Haley (not of comet or ‘Comets’ fame) came to O.R. before starting his illustrious career at the University of Birmingham. I am afraid this was another example of sticking ones head above the parapets – had Brian not written a response to my query about practitioner editors, (see last month) I might not have asked him to write his article!

Headline writers love their puns and, I have to admit, I am no exception even if it does mean having to stretch ones imagination to see the relevance. ‘Cuban Heals’ is about the use of analytics by the Cuban government to improve the tourist industry while ‘Seeing the Trees for the Wood’ is about deforestation and again using analytics to identify areas likely to be at risk. ‘Butterflies in the Chest’ is about the butterfly effect (chaos theory) in the control of cardiac arrhythmias.

And finally, as they say, OR -30 looks back at a philosophical discussion written by Fenton Robb in which he proposes that large human organizations are living systems and attempts to prove this using Popperian standards. James Lovelock has argued similarly about the planet in his Gaia theory, although I am not he has done so quite so rigorously.

<OR>

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BUTTERFLIES IN THE CHEST

NIGEL CUMMINGS

Scientists from Cardiff and Swansea Universities have combined the principles of the butterfly effect and computer simulation to explore new ways of predicting and controlling the beginnings of heart disease.



Dr Christopher George and Dr Dimitris Parthimos

The results of the research can be found in the *Annals of Biomedical Engineering*. In it researchers describe how they were able to disrupt a network of healthy heart cells by using channel-blocking drugs, or chemicals that interfere with intracellular calcium signals, to create a 'wave' of poor communication among cells and then model the results of the disruptions.

Healthy hearts are totally dependent on the synchronisation of huge networks of cells working together for a common purpose; unhealthy hearts arise when communication and synchronisation are disrupted. A loss of synchronicity results eventually in a loss of heart network cells which leads to numerous cardiac problems and in many cases, death for the individuals affected.

The experiments undertaken are important because they provided important clues as to how order and healthy communication could be restored to networks of disrupted heart cells. Dr Christopher George, a molecular cardiologist from the Cardiff School of Medicine, said, 'Much like a murmuration of starlings in flight, the synchronisation and behaviour of thousands of birds gives rise to complex patterns that also have an amazing simplicity to them. But small changes can lead to drastic changes; if, over time, more birds become uncoupled from the dominant flight pattern, either a new pattern of communication would emerge, or the entire network would collapse into disarray.'

The research into this 'butterfly effect' in heart cell synchronisation shows what happens to human cells in heart disease. The well-

ordered behaviour of coupled cells unravels and the synchronisation is lost. Along this route though, there are points at which it is possible to halt, or reverse, this de-synchronisation. These are called the 'crisis points'. Knowing where these crisis points occur could allow for effective medical intervention in time to save the patients suffering from synchronisation disruptive heart disease.

Dr Dimitris Parthimos, a mathematician based in the University's Wales Heart Research Institute, developed the mathematical models that were used to perform the computer simulations required for the research. He said the modelling and research was, 'shedding light on a key driver in the development and progress of heart disease that causes rhythm disturbances and abnormal contraction. The modelling provides insight into how to decode the patterns of cell communication, and this information can be used to design new ways of modulating cell behaviour, to delay the onset of heart disease, and ultimately develop methods to reverse the process if disease is already established'.

Since all organs within the human body depend on communication networks built by cell-to-cell coupling, this work has implications for other diseases from cancer and neurodegeneration to diabetes. The published research paper refers to the behaviour of cell networks, called 'arrays', as a branch of mathematics known as non-linear dynamics.

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation said, 'This new approach of using mathematical modelling to simulate how arrhythmic waves of contraction occur in the heart could lead to the development of ways to block arrhythmias more effectively in patients. With over a million people in the UK living with an arrhythmia, advances in treatment that can improve and even save lives are urgently needed.'

Dr George's research team envisages that developments in imaging technologies will in the near future help to construct detailed 3D maps of entire human hearts, giving them an even more accurate picture of how heart cells communicate with each other, and the tell-tale signs of when things go wrong.

The research was funded by the British Heart Foundation (BHF), the Wellcome Trust, Heart Research UK, the Cardiac Research Development Fund and Ser Cymru's Engineering National Research Network (NRN).

More information on Dr George's work in Calcium signalling and cardiac network architecture can be found at: <http://medicine.cf.ac.uk/person/dr-christopher-george/research/>

RSE Fellow

David Forfar, along with 55 others including Iain Rankin, have been elected as Fellows of the Royal Society of Edinburgh (RSE). During 2010-13 and in 2008 Forfar was project supervisor in MSc Operational Research (Finance) at Edinburgh University. He also supervised post-graduate projects in Actuarial Mathematics at Heriot-Watt University between 2004 and 2012.



Professor Dame Jocelyn Bell Burnell, president of the RSE, said: 'I am delighted to welcome such a wide range of outstanding individuals to the Fellowship. Each of our new Fellows is elected on the distinguished merit of their work. In joining the RSE, they strengthen our capacity to support excellence across all areas of academic and public life, both in Scotland and further.

The RSE has around 1,600 Fellows from Scotland, the UK and abroad who provide the charity with a 'wide range' of leadership and expertise.

More information on the RSE and its membership can be found at: <http://www.royalsoced.org.uk/>

2015 INFORMS Analytics Prize

The 2015 INFORMS Prize for excellence in Analytics and O.R. has been awarded to Chevron Corporation for its long and innovative history of applying Analytics and O.R. across the breadth of the worldwide energy company.



Chevron employs more than 700 O.R. and Advanced Analytics practitioners worldwide. The company offers extensive training programs and frequent opportunities for practitioners to share research. Career paths at Chevron support both O.R. and Analytics from entry level positions to experienced professionals.

More at: <http://bit.ly/1FcAlsg>

2015 INFORMS Edelman Prize

Syngenta, a company which uses Analytics and O.R. to improve food supplies to an increasingly crowded planet, has won the 2015 Franz Edelman Award for Achievement O.R. and the Management Sciences.



With current breeding methodologies, the rate of increase in crop production is not sufficient to meet today's food needs. Syngenta changed that by applying O.R. methods to make better breeding decisions, reducing the time and cost required to develop crops with high productivity.

More at: <http://bit.ly/1xByRVX>

An Aladdin's Cave

Siôn Cave (Decision Analysis Services), on behalf of the System Dynamics UK Chapter has been working on the provision of a repository of presentations / reports / posters / videos etc. This simple library takes the form of a downloadable Excel

spreadsheet containing details of and links to all the available material from 1999 to the present day.



You can access this resource from the 'resource' menu at the main UK Chapter website, or at: <http://bit.ly/1KR3M48>

Six of the best

While the United States tops the QS annual subject rankings with institutions like Harvard and the MIT being ranked first across 21 subject areas. The UK now accounts for 14% of the top 50 spots available.

Six UK universities were ranked best in subjects including: education; development studies; art and design; English language and literature and; business and management studies. London Business School for example has been ranked top in Business & Management Studies.



This marks a slight improvement on 2014, where the UK led in only five subjects – though both development studies and art and design are new categories. This year the University of Sussex, London Business School and the Royal College of Art joined the list of UK universities to be awarded first place.

EPSRC seeks experts

EPSRC

Engineering and Physical Sciences
Research Council

The EPSRC is re-opening its search for applications to join the Information and Communications Technology and Research Infrastructure e-Infrastructure Strategic Advisory Teams (SATs). There are currently vacancies in 'Fundamentals of Computing', 'Social Interactions with ICT' and 'Research Infrastructure – e-Infrastructure'.

The roles are 'to guide and advise as theme experts'. EPSRC is looking for full-time or part-time workers, those on sabbatical or taking a career break, academic or researcher, based in academe, industry, the third sector or government organisation.

Participants will not be expected to act as a representative of their own organisation but rather as someone with an expert command of a particular theme that is free of bias.

More information at: <http://bit.ly/1EKG462>

Boost in Cybersecurity Funding

Queen's University Belfast has been awarded funding from EPSRC to continue research into cyber security. The funding which amounts to £5 million will focus on Smart Cities and the Internet of Things.



The funding which will facilitate major expansion of the Centre for Secure Information Technologies (CSIT) at Queen's University Belfast will also be used to enhance security in virtual environments

and connected devices, and tackle emerging malware threats to detect and prevent fraud and personal information theft from laptops, smart phones and cloud storage.

More information on:

<https://www.epsrc.ac.uk/newsevents/news/csit1/>

Too hot for Maths?

Joshua Graff Zivin of the University of California at San Diego and two colleagues have published a paper which links mathematical ability negatively with temperature.



The researchers were able to study 8,003 students who had been given recurring maths and reading assessment tests. The data set allowed them to overlay test scores with the average temperature in the county where they lived on the day of testing. The surprising result, 'We find that math performance declines linearly above 21C (70F), with the effect statistically significant beyond 26C (79F).' This is particularly strange since many of these children sat these tests in air-conditioned rooms.

More information on this study can be found at: <http://wapo.st/1L6z9Zs>

Ant and Bot

Scientists observing 'ant behaviour' believe ants may hold the key to developing for more effective techniques for search and rescue. A new study undertaken at Sheffield University and the Georgia Institute of Science and Technology, has shown that fire ants in particular, are very adaptable arthropods, able to alter the way they dig and build depending on the conditions they encounter in the wild.

Programming such ant skills into remote controlled robotic arthropods equipped with swarm intelligence algorithms, could



provide a solution in search and rescue operations, where conditions are too hazardous for humans to operate, but safe for deployment of 'swarm robots'. A fascinating video on this research can be found at: <http://bbc.in/1AlbNmR>

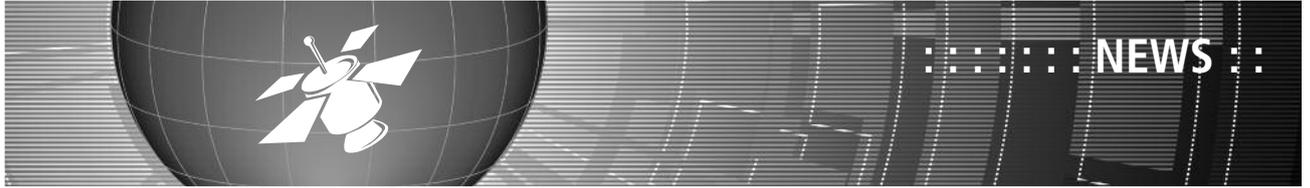
Skilled Volunteering: Pro Bono O.R.



Pro Bono O.R. provides free support to third sector organisations in the UK. Since September 2013, we have completed 18 projects, are currently working on a further 16 and have several others about to commence. We have over 250 volunteer analysts registered across the UK of whom 96 have applied to work on projects and 54 who have worked on or are currently working on projects. To find out more please visit:

<http://www.theorsociety.com/Pages/Probono/Probono.aspx> or contact felicity.mcleister@theorsociety.com

SUBMIT YOUR
IN BRIEF STORIES TO
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INVITATION TO BID TO PROVIDE OR SOCIETY TRAINING COURSES IN 2016

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

The OR Society's Training Working Group invites bids to provide training courses in 2016. All offers of courses will be considered, though there is no guarantee of acceptance.

For 2016, courses in the following areas are particularly encouraged:

- 'New' areas - help us keep the O.R. community fresh in its thinking;
- Courses relevant to analytics;
- Practical courses relevant to the issues of the day – doing more with less, efficiencies, reducing waste and duplication;
- Advanced courses in more traditional areas, which start from MSc level and take the subject to a specialist level; and
- Courses given by practitioners or those with a good practical knowledge of the subject.

Other courses which we know from experience are likely to do well include 'how to do it' courses such as 'How to build clever models with spreadsheets'. Generic courses such as 'Presentation Skills' are less likely to be accepted unless they have a particular O.R. theme or focus. There are plenty of big-time training providers who offer these generic courses at much cheaper rates than we can consider.

An information pack is available giving details of the Society's terms and conditions for course providers, including:

- the quality framework to which all tutors are expected to adhere;
- the impact of the trainer's fee on the delegate fee for the course and the likelihood of success of bids;
- the details of course content, target audience, etc, that tutors are required to provide.



In the past, the Society has experienced difficulty in promoting certain courses and in responding to queries about them, on account of the paucity of information supplied by course providers. Failure to provide adequate information may result in a bid being rejected.

Bids must be submitted on forms obtainable from and returnable to:-

Jennie Phelps at The OR Society, 12 Edward Street, Birmingham B1 2RX. Tel 0121 234 7818. Fax 0121 233 0321. Email jennie.phelps@theorsociety.com.

Closing date for the receipt of bids is **Friday 29 May 2015**. Bidders will be notified of the outcome at the beginning of July.



Join in the OR Society's social media initiative



@TheORSociety



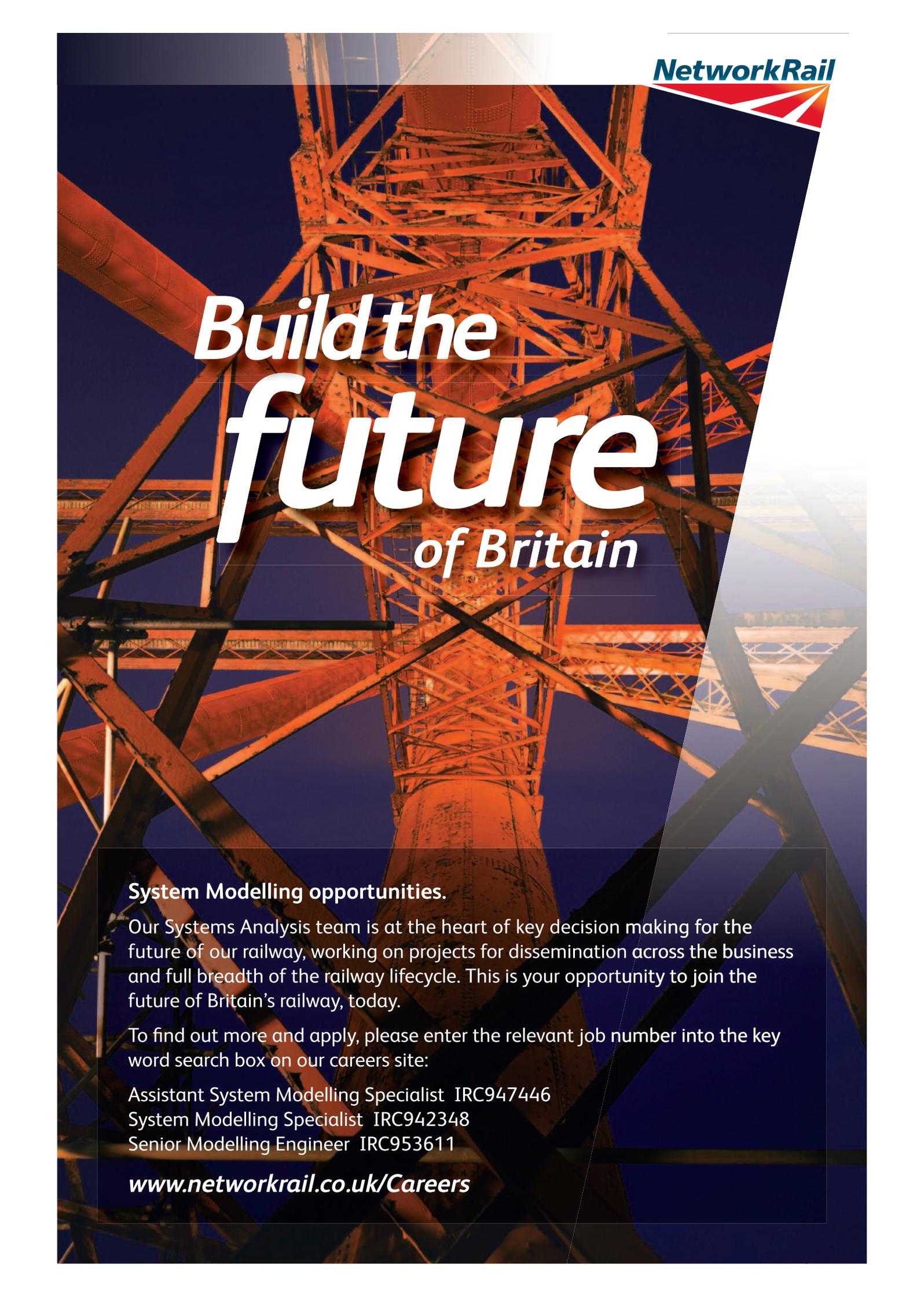
The OR Society



The OR Society

Help in getting started is here if needed:

www.theorsociety.com/Pages/Networking/FollowUs/GettingStarted.aspx

A low-angle, upward-looking photograph of a large, orange-painted steel railway bridge structure against a clear blue sky. The perspective creates a sense of height and scale, with the bridge's complex lattice of beams and girders filling the frame.

Build the future of Britain

System Modelling opportunities.

Our Systems Analysis team is at the heart of key decision making for the future of our railway, working on projects for dissemination across the business and full breadth of the railway lifecycle. This is your opportunity to join the future of Britain's railway, today.

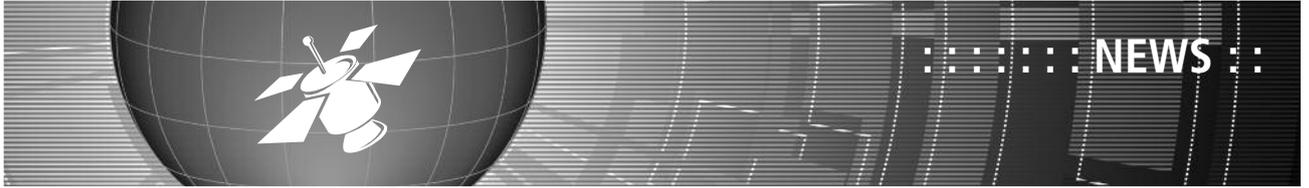
To find out more and apply, please enter the relevant job number into the key word search box on our careers site:

Assistant System Modelling Specialist IRC947446

System Modelling Specialist IRC942348

Senior Modelling Engineer IRC953611

www.networkrail.co.uk/Careers



SEEING THE TREES FOR THE WOOD

NIGEL CUMMINGS

Deforestation is an environmental problem affecting every continent.

A collaboration between Orbital Insight, based in Mountain View, California and the World Resources Institute (WRI) is utilising artificial intelligence (AI) experimentally as part of its toolset, to parse tens of millions of high-resolution satellite images from WRI's Global Forest Watch, which already draws on data from the University of Maryland, Google, NASA and other organisations.

Artificial Intelligence techniques, can, when applied to satellite imagery assist in the prediction of the locations where deforestation will occur and provide insight into reducing its environmental impact. The mission of the Orbital/WRI AI experiment is to identify factors, such as encroachment from new road construction in remote areas that could be predictive indicators of threats to forests.



During the initial phase of the collaboration, Orbital Insight uses business analytics technology to provide evidence of proof-of-concept by analysing images from areas that already have suffered losses, looking back to identify key moments when encroachment activity began.

Still in its early days, the AI experiment, and its algorithms could be scaled up to factor in other environmental factors which affect Earth's vegetation and oxygen sustainability. Eventually it is hoped AI techniques could routinely be applied to the overall Global Forest Watch database so that the organisation could detect areas of potential concern.

The insight provided from such analysis can according to a spokesman from Orbital Insight, be passed on (*at a cost*) to local authorities who could intervene proactively to halt clear cutting and other activities that threaten forests. Currently while the AI experiment is being fully tested, data derived from it will be provided free to those authorities who ask for it.

Orbital's aim is to sell predictive data services based on its work with satellite imagery and data collected from drones (*Drones are not cheap!*). Orbital Insight is expected to make a profit at some point in its future to repay and reward its many investors.

In addition to providing information about areas of deforestation, the company is also hoping to market business intelligence about ideal crop harvest timing, retail sales forecasts extrapolated by counting cars in shopping centre car parks, and oil forecasts calculated by watching tank levels and tanker truck activity. This information will be sold by subscription.

Returning to issues arising due to deforestation, we cannot ignore the value of any study done into its effects globally, as deforestation accounts for up to one-fifth of global greenhouse gas (GHG) emissions. Many giant global companies are aware of the effects of deforestation and they are pressuring their suppliers to help curb the practice. (The Forest 500 ratings system grades their progress.)

In the lead so far: Nestle; Groupe Danone; Kao Corp.; Procter & Gamble; Reckitt Benckiser Group; Unilever and McDonalds. Many of these companies have signed a 'Declaration on Forests', which pledges to end deforestation by 2030. McDonald's have taken this a step further by pledging to set 'time-bound' goals this year for ending deforestation throughout its supply chains for beef, coffee, palm oil, poultry and the fibres used for its packaging.

More information on Orbital Insight can be found at: <http://orbitalinsight.com/>

<OR>

'Artificial Intelligence techniques, can, when applied to satellite imagery assist in the prediction of the locations where deforestation will occur and provide insight into reducing its environmental impact.'

EXACTLY HOW MANY CHIPS IS THAT?

IAN TAYLOR, FLYINGBINARY

Data is now officially big. No, I mean really, really big. With apologies to Douglas Adams, it's easy to dismiss the hype around the big-ness of data - and for the most part we should do just that.

But there is a deeper aspect to big. One billion minutes is almost two millennia ago - the year 112 - yet we would all laugh if someone offered us a new computer with a 1Gb hard disk! The truth is that once outside 'human-scale' we really are hard pressed to digest large quantities properly.

With this in mind, we are offering three one-day courses in the OR Society's training programme for 2015 - *The Science of Data Visualisation*, *From Big Data to Open Data* and *Actionable Intelligence*. These three courses cover a broad sweep of skills from the specifics of creating visualisations, through methods of presenting and influencing, to the tools you can use to tame big and open data.



As the artist Ursus Wehrli shows in the humorous image [above], if we can only apply order to our surroundings, we can gain insight. We must also be able to communicate that insight clearly - just as he does - and use that to drive effective action.

Almost everyone is now accountable for analysing data, extracting meaning and then acting or advising. If you need to advise, influence, present or persuade, then *Actionable Intelligence* on June 4th is for you. If you must tackle big data problems in your organisation or augment in-house knowledge with open data, go for *From Big Data to Open Data* on June 3rd. Or, if you perform the actual analysis, *The Science of Data Visualisation* on June 2nd will explain what works and what doesn't.

What would your working day look like if you *always* had the right answer, *knew* what action to take, and *could persuade* everyone else to commit to that path? Now imagine extending that to your whole team, department or organisation. We have examples where these skills have grown from a team of 10 to over 600 in two years. Why not you too?

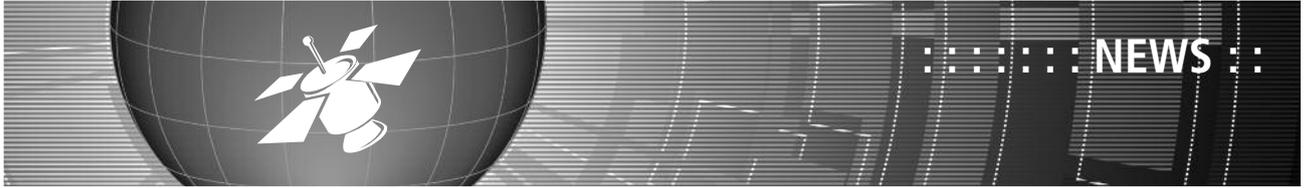
The good news is that you can start exactly where you are, with the tools and data you have right now. All of the courses provide practical techniques that you can use right away, and we recommend leveraging your organisation's current assets - so you're not walking back in with a big purchase order request either.

The Science of Data Visualisation sold out last year and so is back by popular demand along with the two new courses offered as a result of delegate feedback. While there are some spaces left on all three courses this won't last long, so check out the Training Programme page and claim your space!

<OR>

CONFERENCE NEWS

EVENT:	EURO2015	DATE:	12 (welcome), 13 – 15 July 2015	VENUE:	University of Strathclyde, Glasgow
EVENT:	YoungOR 19	DATE:	22 – 24 September 2015	VENUE:	Conference Aston Marketing Suites, (CAMS), at Aston University
EVENT:	Blackett Lecture 2015	DATE:	26 November 2015	VENUE:	Grocers' Hall, London
EVENT:	8th Simulation Workshop SW16	DATE:	11-13 April 2016	VENUE:	Ettington Chase Hotel, Stratford



IMPACT

JOHN CROCKER

By now you should have all received your first free copy of *IMPACT*, the latest publication from the OR Society. It is inevitable that it will be compared with *OR Insight*, which, in some ways it has replaced but as you will see, it is very different from it.

Physically, it is different in size (A4 rather than A5) and it is on glossy paper (although neither of these factors will be particularly evident or relevant if you are viewing the electronic version). What will be evident to all is the greater use of colour and graphics.



But, the main difference is to a certain extent, behind the scenes. Each article has been written specifically to be readable by a person with a non-O.R. background but who might be interested in or benefit from a better understanding of O.R. and Analytics. In some cases the articles will be written by the original people involved in the work but in other cases the services of a professional journalist have been employed.

The main purpose of the magazine is show how Operational Research and Analytics can make an 'impact' in the real world and to spread that message to as wide an audience as possible.

When the idea was first raised in one of our Publications Committee meetings – we are always on the lookout for potential new titles – there was a great deal of discussion. I think it is true to say that Palgrave did not immediately leap at the idea (glossy magazines are

not really their thing). Unlike KMRP, JOS and HS before it, there was no one really pushing the committee. There was a time when editing a journal would have been seen as a career-enhancing move but I think it is true to say that this is no longer the case (neither for academics nor practitioners). We needed someone whose career (and family life) was well-established that would not suffer from these extramural activities and yet still have the drive, enthusiasm and vitality of youth.

The task of editor, particularly one of a brand new publication, is by no means easy. The Society had to be convinced since much of the costs would be borne by them; the publishers also had to be convinced since we would be using their resources. This would require a business case and hence a fair amount of marketing to try to identify a market and estimate its potential size. The magazine will also need to become self-financing through both subscription and advertising. Probably even more difficult than this, though, would be dealing with the Publications committee all of whom had their own ideas about what it should be; how it should look; who it should be aimed at; how it should be put together; who should write the articles; how long they should be and so on.

I think Graham has done a marvellous job but, of course, it is up to the rest of us to ensure its future success and with it, hopefully that of Operational Research and the OR Society. So, if you know of any potential stories, advertisers or subscribers please contact Graham Rand or the OR Society.

<OR>

THE OR SOCIETY NEEDS YOU AS ITS EURO / IFORS REP

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

The Society is a member of both EURO, the European Association of O.R. Societies, and IFORS, the International Federation of O.R. Societies. We're looking for a volunteer to act as the Society's representative with both these organisations. The appointment will be for a three year term, renewable for a further term of three years.

The role will include representing the Society in all admin matters including ensuring all relevant matters are presented to Board and/or General Council. This can include nominations for EURO /

IFORS officers, nominations for prizes or awards or voting matters such as the acceptance of new membership applications. The role offers support to attend the relevant EURO / IFORS conference.

If you're interested in this role, please get in touch. You will need to submit your CV plus a covering letter explaining why you'd make a great candidate for the role. Email me at gavin.blackett@theorsociety.com

<OR>



Operational Analyst Consultants

We are currently recruiting Consultants with a background in Operational Analysis (or Operational Research) within the UK Defence Sector to join our growing Management and Technical Consultancy.

If you have experience of at least two of the following, then we would like to hear from you:

- Applying Operational Analysis within a Defence environment.
- Delivery of key Concept and Assessment phase products, such as:
Concept of Analysis (CoA),
Benefits and Causal Maps,
Combined Operational Effectiveness and Investment Appraisal (COEIA),
Operational Analysis Supporting Paper (OASP).
- Engagement with central scrutiny and assurance stakeholders.
- Interpretation of information relating to the technologies, architectures, and operational procedures of ICT Solutions.
- Communications and information systems in the Deployed and/or Fixed Environment.

Forward your CV, along with a brief covering letter, to recruit@actica.co.uk.

Direct applications only please.

www.actica.co.uk



27th European Conference on Operational Research

12-15 July 2015
University of Strathclyde

EURO
The Association of European
Operational Research Societies



For more information on all aspects of this amazing conference, and to register, go to www.euro2015.org

**If you have registered to attend but not yet paid,
Please do so now to secure your place!**

**If you haven't registered to attend,
hurry and do so now so that you don't miss out!**

Great opportunities still exist for Exhibitors and Sponsors!

We have ten fascinating Keynote and Tutorial speakers:

Jacek Blazewicz, Horst Hamacher, Raimo Hamalainen, Eva Lee, Stefan Nickel, Tony O'Connor, Martin Savelsbergh, Ariela Sofa, Thomas Stuetzle, Michael Trick

Details of these speakers at:

www.euro2015.org/key-note-and-tutorial-speakers

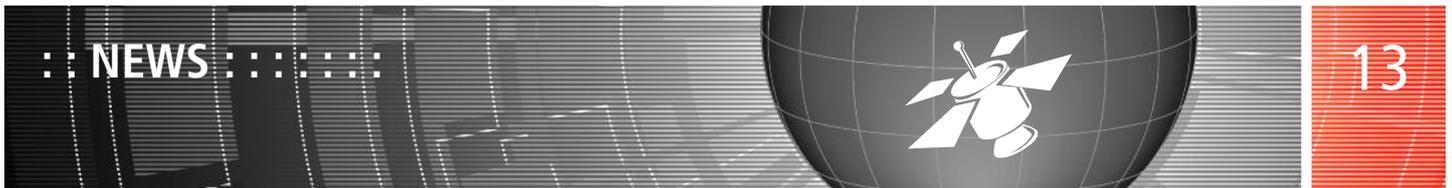


**Informal
Social Evening
Monday 13 July
19.30 - late
Merchant Square
Glasgow**

The evening of Monday 13 July will allow you to join your peers and colleagues at the must-attend EURO2015 Conference networking event. Set in a diverse and quirky venue located only a few minutes' walk from the Strathclyde University campus, Merchant Square will be the perfect venue for you to unwind and relax.

Enjoy excellent food and sample some fine Glasgow hospitality whilst you meet old acquaintances and make new friends. Each ticket includes a two course meal and entertainment.

Tickets are priced at £29.50* for students and £34.50* for full conference registrants and can be purchased at the time of completing your registration (*inclusive of VAT at 20%)



27th European Conference on Operational Research

12-15 July 2015
University of Strathclyde



FIVE REASONS TO ATTEND EURO2015 – AND SPREAD THE WORD!

RUTH KAUFMAN

If you are interested in practice, analytics, data science or any of the other O.R.-related activities, here are five good reasons to attend EURO2015

EURO2015 is the premier European conference for Operational Research and Management Science. It is *the* place to present your work to researchers, academics, practitioners, and students interested in any branch of O.R., mathematical modelling or economic analysis. But if the deadline for submitting a paper has passed you by, there are still five good reasons to attend – especially if you are interested in practice, and even more especially if doing analytics, data science or any of the other O.R.-related activities as part of your daily job.

Reason 1: Find solutions to typical challenges faced by practitioners.

Come to one of the workshops designed specifically for practitioners, tackling issues such as quality-assuring models, cleaning dirty data, turning ideas into solutions, polishing up your CV. Or sign up for a one-to-one mentoring session, to explore your individual practice problems.

Reason 2: Gain understanding of tools that you've not tried before.

'Technique-taster' workshops on topics such as data science, robust optimisation, group causal mapping, system dynamics and more are all designed for practitioners. That's on top of the software exhibitors advising on a variety of tools from the simple to the sophisticated.

Reason 3: Learn from inspiring plenary and keynote speakers, and from more case studies than ever before at EURO.

International thought leaders talking at EURO2015 include Sir Alan Wilson on complex modelling for the city in 2065, Mike Trick on combining prescriptive and predictive analytics for impact, Raimo P. Hämmäläinen on Behavioural O.R. and many more. And from the less eminent, a host of presentations will describe innovative solutions, or lessons learnt in trying, across streams including Case Studies in O.R./Analytics, O.R. In Industry, Healthcare, Government, Defence,

Financial Modelling, Risk Management, Logistics, Developing Countries, the European Excellence in Practice Awards, to name but a few.

Reason 4: Connect and share experiences with O.R. practitioners and academics, from the most junior to leading experts in their field – build a network that will last.

The sheer variety of presentations and activities on offer will enable the gregarious to exchange interesting ideas and make long-lasting contacts that will help develop work in the future. And it's not just for the extroverts and serendipitous: speed-networking, the academic-practitioner bazaar, and a full social programme enable everyone to benefit.

Reason 5: Re-invigorate your practice with the ideas and the opportunity to reflect, sparked by three days in the friendly company of fellow O.R. people from across the O.R. community.

Whether it is the potential for improved methods or novel areas to explore, inspired by a visit to a forecasting or 'emerging applications' or 'climate change' or 'strategy' stream; or for different ways of doing things inspired by a 'Design thinking' workshop or an 'Ethics' presentation; or for different things to do inspired by 'Grand Challenges', 'O.R. in Schools' or 'Pro Bono' workshop – you'll go home full of ideas for better ways of doing O.R. Fitting for the Science of Better, really.

There's only room here to mention a tiny proportion of the activities on offer at EURO2015. For fuller details, go to www.euro2015.org and www.euro2015.org/MAI. July 12-15, Glasgow: put it in your diary, tell your friends and colleagues to put it in theirs, follow us on Twitter at [@euroconf2015](https://twitter.com/euroconf2015) and [@TheORSociety](https://twitter.com/TheORSociety) – just don't risk missing out.

INSPIRING AND MOTIVATING YOUNG PEOPLE: O.R. IN SCHOOLS IS MAKING A REAL DIFFERENCE

CHARLENE TIMEWELL

This is a really exciting time to join the O.R. in Schools initiative!

O.R. in Schools Taskforce

If you have experience and an interest in educational outreach, the Taskforce would be interested to hear from you. The Taskforce meets three times per year at the Society's offices in Birmingham. Travel expenses are reimbursed and free lunch and refreshments are provided.

O.R. in Schools Volunteer

A fundamental aspect of the O.R. in Schools initiative is the promotion and organisation of free visits to schools, colleges, and universities. Having an O.R. professional as a visitor in the classroom to speak about their career or lead an interactive workshop can really enthuse and motivate the students. This opportunity is great for your C.V. or annual review and would be a valuable contribution to The OR Society's vision of making sure **'every school child knows what O.R. is'**. The generous offer to give your time, skills, and experience to support the O.R. in Schools programme is invaluable. In return, we are able to offer you support, guidance, and resources to ensure that your volunteering experience is enjoyable and rewarding for all involved.

Get in touch with The OR Society's Education Officer for an informal discussion and to find out more information about either of these opportunities.

Free O.R. in Schools Training

The OR Society offers a free, tailored support programme for ORiS Volunteers, comprising an initial one-day training course followed by ongoing skills development workshops. Sessions will be running on different dates and at different venues around the country, so volunteers can meet, develop valuable skills, and share their experiences when and where it is most convenient.

Initial Volunteer Training Course: Birmingham 9.30am to 3.30pm, Friday 5 June 2015

This free, one-day course is taking place at The OR Society's Training Suite in Birmingham. It will cover introductory training, how to apply effective teaching strategies as a volunteer, tips for producing and delivering a presentation in schools, and training for successful delivery of an interactive O.R. workshop. It is suitable for volunteers who are new to ORiS and for those volunteers who have not yet completed this course.

Free Lunch and Refreshments

Travel Expenses Reimbursed

Course Cost: FREE for ORiS Volunteers

Get in touch with The OR Society's Education Officer today to book your place.

ORiS will be at the #euroconf2015 in Glasgow (12-15 July) ...Will you?

Explore how the ORiS initiative broadens young people's horizons by demonstrating exciting, real world applications and possible careers using some of the mathematics they're learning in the classroom. Celebrate the successful, yet challenging journey that the ORiS initiative has made so far, and enjoy an insight into future plans, particularly in light of the UK mathematics curriculum reforms. Find out why O.R. practitioners are fundamentally vital to the success of ORiS, enjoy hands-on tasters of the most popular, interactive ORiS workshops, and discover how to get involved in your local area.

Get in touch:

Email: charlene.timewell@theorsociety.com

Tel: +44 (0) 121 233 9300

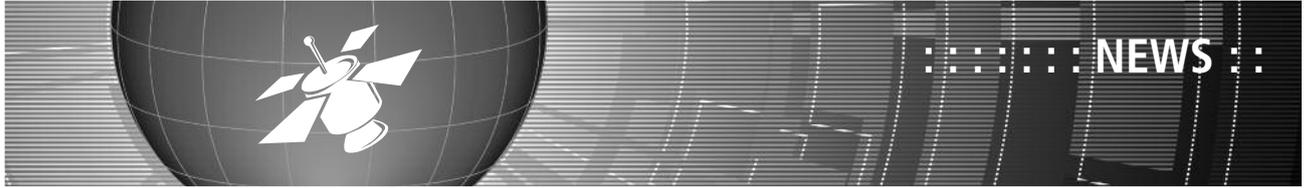
Tweet: @ORinSchools



REGIONAL SOCIETIES

Contact details for all regional societies and meetings past and present are listed at:

<http://www.theorsociety.com/Pages/Regional/RegionalList.aspx>



ELSIE CROPPER SHIELD FOR BEST PAPER AT YOUNGOR 19 CONFERENCE, 22 – 24 SEPTEMBER, 2015

J.C. RANYARD

The Elsie Cropper Shield was instituted in memory of Elsie May Cropper, a senior member of the Operational Research Executive of British Coal, who died in service in 1989 at the age of 44.



Elsie had always been a strong supporter of young and trainee O.R. staff and was always supportive in their further development.

All presenters at YoungOR 19 are eligible, except for Plenary Speakers, those giving tutorials or workshops and those who would not normally be eligible to attend the YoungOR conference.

All YoungOR 19 delegates are invited to rate the presentations that they attend, using a pro forma which is available at each session. The session chair will collect the voting papers at the end of each session and pass them on to the committee. The Organising Chair will appoint two judges, one of whom will be a member of the organising committee. The judges will scrutinise the voting papers and decide on the winner.

The following criteria will be used as guidelines:

1. Impact of the work – both quantitative and qualitative. For

example, does the work have current/potential demonstrable benefits; has it resulted in a better understanding of the problem area or improved management practices?

2. Technical Content – for example, appropriate choice of techniques/methodologies.

3. Quality of presentation – for example, logical structure, clear slides etc.

The winner will have his or her name inscribed on the Elsie Cropper Shield and will be invited to attend the Blackett Lecture on 26 November 2015 at which the shield will be formally presented. The winner will also receive a commemorative plaque. The winner of the Shield will be announced on the last day of the conference after all eligible talks have been presented.

<OR>

WANT TO ATTEND YOUNGOR19 FOR FREE?

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

Simpson Scholarships are designed to enable one or two outstanding young operational researchers to attend the OR Society Young OR Conference, and to encourage them to present papers on their work in O.R.

The scholarship covers the conference registration fee, (including lunches, teas/coffees and other meals) conference accommodation and reasonable travel expenses incurred in attending the conference.

To be eligible you must have been in O.R. for less than 10 years. This period needs to include at least two years' working experience, based in the United Kingdom, of Operational Research in industry, commerce, government, or in a University teaching or research post. In the case of multiple authorship of a submitted paper, all of the authors must meet these conditions, although only one of the authors will receive the award.

To apply please send an extended abstract of the paper which the

author(s) intend to present at the conference. You also need to supply the names and contact details of two independent referees, one a member of the Operational Research Society, the other a client unless inappropriate, who are in a position to testify as to the accuracy of the submission and the fact that the work described was done by the candidate(s). A detailed curriculum vitae is required for each candidate, and in the case of multiple authorship of a submitted paper, the submission must also include a statement detailing the contribution that each author has made to the work described. Submissions should be sent by email to Gavin Blackett, Secretary & General Manager of the Society, email gavin.blackett@theorsociety.com. The closing date is 31 May 2015.

<OR>

O.R. SOCIETY 'THIRD SECTOR' SPECIAL INTEREST GROUP: SERVICES TO YOUNG PEOPLE

JEFF JONES

The 'Third sector' Special Interest Group held its Spring Seminar on the 23 April, at the London School of Economics.

The topic was pro-bono consultancy, carried out by OR Society members, to charities involved in providing support to children. The Seminar was notable for its range of topics: from strategic planning to detailed help to individuals; from poverty models for the whole country, to services in the London Borough of Camden. The Seminar was well attended by both O.R. analysts and charities, the lecture theatre being completely full; and it was followed by a reception of drinks and snacks in a nearby room which provided a lively networking opportunity.

The first speakers were **Malcolm Fenby** and **Joanna Ziff**, who had worked together pro-bono for the Childhood Trust. They started by emphasising the size of the problem of poverty in London. More than 600,000 children in London live in severe poverty, two in five of the UK's children living in poverty are living in London, and London has the fourth highest rate of child poverty among the world's richest cities.

The Childhood Trust is an umbrella organisation, that passes on funds to 28 charities (2012–13 figures) operating in London. It funds projects in all London boroughs. The project was aimed at providing better data to the Trust, to enable them to target resources on those projects that have the greatest positive impact on alleviating child poverty in London. The project team proposed the development of an Impact Report incorporating infographics to illustrate key statistics. It was proposed that where data availability was sufficient, appropriate charts and graphs would also be included in the report.

Following consultation with The Childhood Trust staff, the project team designed a questionnaire to send out to all 24 recipients of funding via the 2013-14 Big Give. The questionnaire was designed in Survey Monkey and sent out from The Childhood Trust to maximise the response rate. The questionnaire response rate was a good 58%.

From this the suggested desired outcomes were:

1. Partner charities to think in terms of measurement (indicators) when thinking about Impact.
2. The standard of Impact measurement (conducted by partner charities) to be raised to that of the best (of the existing measurement).
3. A standard set of Impact Measurement tools (measures and methods) are identified that can be used by many charity partners (possibly grouped by activity).

The Trustees were invited to endorse these outcomes.

The next speaker was **Rose Drummond**, working for Elfrida Rathbone Camden (ERC), a charity supporting young disabled people living in the London Borough of Camden, their carers and families in need. It is a small charity involved in a diverse range of projects:

- Advocacy – for families of young carers
- Life skills courses - for young disabled people to bridge the gap from adolescence to adulthood
- Support and advice – for families with a range of problems. Debt and welfare advice, family relationships, parenting, children's emotional problems, education.

There is a diverse range of funders for different projects, and each project had its own monitoring and evaluation framework.

This project's aim was to develop a measurement framework at top organisational level that would bring together the diverse range of projects. From their detailed background research, Rose's team realised it was unclear what outcomes to measure - the projects were too diverse to simply combine existing outcome frameworks. So they chose the Charities Evaluation Service template to structure the framework – a flexible step-by-step guide to defining outcomes, indicators, collection methods and frequency.

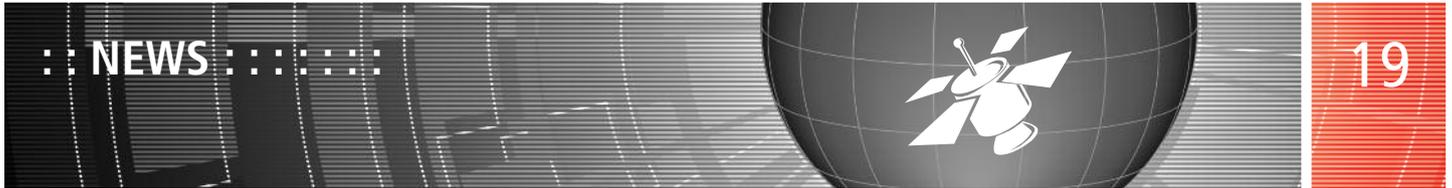
The main method to find an agreed value system was a facilitated 3 hour workshop to agree key outcomes, involving 12 people representing ERC charity exec/trustees, service users and staff/volunteers. This was a key success of the project – a unique opportunity to hear from all these groups and get buy-in, agreement and joint ownership.

The workshop agreed that the main priorities were:

- Improved mental health
- Increased opportunity to access employment, volunteering, training
- Increased access to support and social networks
- Reduced risks, and
- Cultural shift - the community benefitting from the contribution of disabled people.

This enabled Rose's team to design an indicator framework which was usable by all projects.

The next speaker was **Sue Merchant**, an ex-president of the OR society. She had been working for AYME, the Association of Young people with ME. This is a charity which supports young people (up to 26 yrs) who have Myalgic Encephalopathy (Chronic fatigue syndrome).



AYME. The charity:-

- Provides telephone and on-line support to sufferers/families
- Provides help booklets on the condition
- Produces a newsletter
- Raises awareness of the condition nationally
- Helps educate professionals on the condition, and
- Employs sufferers as volunteers.

The task was to facilitate a half day workshop of trustees and CEO to help produce a new strategic plan. The problems were that there would be limited time with the client, the workshop date was perilously close, the knowledge level of trustees was variable, and the AGM immediately preceded the workshop, so a full half day was unlikely.

After an initial investigation, Sue sorted all the ideas for improvement (so far collected) into groups and typed up under these headings for circulation at the workshop:

- Increase staff/volunteer capacity
- Enhance member services
- Improve awareness of ME and AYME
- Increase number of members
- Increase income
- Improve communication internally.

The workshop was divided into two groups- each discussing half of the ideas, seeing if there was anything to add, and

- annotate with symbols: smiley faces, £ and clouds
- sort ideas into symbol charts and present back to the other group
- prioritise actions – green dots on each of the charts
- agree action plan for next steps
- Trustees to look later at budget and resources to adjust list.

The client found this analysis very useful, and subsequently used it to devise their new strategy.

The final speaker was **Dave Buxton**, the founder of dseConsulting. Dave explained that he encourages his staff to spend two weeks a year doing pro-bono work in the charity sector, to broaden their experience. He talked about his recent work for the Joseph Rowntree Foundation, looking at the causes of poverty. JRF had previously tried to model poverty using system dynamics, which is a high level method dealing with aggregate data on the numbers in poverty, and the flows in and out, and the causality. This proved not to be very successful, and so a more detailed and bottom-up approach was required.

Dave introduced the technique in which he specialises, which is Agent Based Modelling. ABM, in this case, involves detailed models of a range of household types; for each, building in the likely behavioural response to changing external signals. These can then be aggregated up to national level figures, but it is structured as a bottom up approach. The specific question investigated was, given a child (say a 5 year old), what is the chances, given various future changes, that he/she will be in poverty in 20 years' time? These complex models can thus be used to investigate the effects of different future trends, and different policies. So far it has shown some unexpected results. For example that school expenditure and housing were not major factors, but that home life and teacher quality were most important.

Finally the Chairperson (me) thanked everyone for coming. And in particular the five excellent speakers, and Felicity McLeister – the O.R. Pro Bono Project Manager, for doing all the work while Jeff took the praise. And especially Henrietta Burr, from the LSE management department, for the fantastic support she gave throughout.

The slide shows will be put on the OR Society website, in the Document Repository; and a video, including interviews with the speakers, will be put onto YouTube.

<OR>

MAKE SURE YOUR CONTACT DETAILS ARE UP-TO-DATE

Contact Carol Smith

carol.smith@theorsociety.com

or go online to www.theorsociety.com

log on and click 'My Contact Details'



GRAND CHALLENGES FOR O.R.



JANE PARKIN



MILES WEAVER

‘O.R. was founded by rising to the challenges of WW2 and was used to protect Britain and ultimately help to liberate Europe.’

There are a whole host of ‘Grand Challenges’ that we all face across the family of nations that make up the UK and beyond today. What can we as the O.R. community contribute?

Both other learned Societies and Governments are discussing this. Recently, the British Academy and Royal Society attempted to address this question in a conversation on ‘*Tackling the Great Challenges of the 21st Century*’ between Sir Paul Nurse, President of the Royal Society; Lord Stern, President of the British Academy, and a packed audience of interested and lively debaters¹. They discussed the new opportunities and need for collaboration between the traditional academic disciplines to respond to the big issues of our time, highlighting why the UK’s research base is such an important national asset. They set the great challenge areas of food, energy and health; there was considerable discussion of the issues of inequality, population growth and ageing, energy use, health, sustainability and carbon emissions. If you have not already seen this, it is well worth watching.

The House of Commons Public Administration Select Committee recently published *Leadership for the long term: Whitehall’s capacity to address future challenges*² which stated that the day-to-day too often crowds out preparation for the longer term and the unexpected, and highlighted the role of Government in promoting new technology and innovation across the public and private sectors, such as in reducing CO₂ emissions in transport, or leading the revolution in electrical energy storage. The report gave as an example the failure to act quickly on the developing Ebola epidemic in West Africa which cost thousands of lives and billions in aid. The recommendation was that Government should set out how it will improve the machinery of government and better educate civil servants at all levels to think about systemic risk, risk management, uncertainty and future challenges (all areas that we in O.R. are used to tackling).

EURO2015 is being held in Glasgow. In 2007, the Scottish government articulated the goal of creating the type of Scotland they want to be: a more successful country, with opportunities for all to flourish through increasing sustainable economic growth. Progress is tracked by ‘*Purpose Targets*’ covering Economic Growth, Productivity, Participation, Population, Solidarity, Cohesion and Sustainability and is supported by National Outcomes and Indicators, covering key areas of health, justice, environment, economy, and education. ‘*Scotland Performs*’ reports on progress of the government in creating a more successful country, with opportunities for all to flourish through increasing sustainable economic growth³.

Where is O.R. in all this? O.R. was founded by rising to the challenges of WW2 and was used to protect Britain and ultimately help to liberate Europe. However, since then, although O.R. retains the ability to do high stake work and is capable of high level

interventions, it tends not to be involved in high level issues; the interest in tools and in solving 'a narrow part of a complex problem' tends to locate work at the operational level. Soft O.R. methods were developed to widen the scope of O.R. from 'problem solving' to 'problem defining' but it still tends to be neglected by decision makers.

O.R. has considerable advantages for dealing with strategic issues and grand challenges: it has a systems orientation, is interdisciplinary and is explicitly purposeful⁴. O.R. with its capacity for holistic thinking, problem structuring and modelling has the capability to contribute to our understanding of challenges and to make an impact. There is an opportunity for O.R. to be used in exciting new areas, ones in which human relations play an increasing role, and yet still applying the field's hallmark of rigorous systems thinking and modelling. We need a seismic shift to address many of the challenges that face people and the planet today. There are deep rooted social and environmental problems with economic, environmental, social and governance dimensions.

How do we in the O.R. community identify where we can best contribute and make the most impact? We have already started by launching the OR Society Pro Bono O.R. service in 2013 so that charities can benefit from free O.R. consultancy. We offer to help charities in areas such as strategic and business planning, evaluating impact, process improvement, efficiency improvement and options appraisal. This challenge has been enthusiastically taken up by the O.R. community with over 300 registered volunteers of whom 96 have applied to work on projects. To date we have helped 30 charities and are currently working for another 14 with a further 20 enquiries in the pipeline.

Can we get our community focused on having a mission to address these grand challenges? We will be running a session at EURO2015 with the Voluntary Action Fund, a long established Scottish grant maker, which will seek to address the need to identify what these 'grand challenges' might be, develop responses on how the O.R.

community could make an impact in these areas and provide a call to action to address specific needs identified in the location of EURO 2015 (we hope to see you there). We don't propose any answers but are eager to have a vibrant and dynamic conversation at Euro 2015 where we can suggest some directions that the OR Society can consider. We want to identify emerging themes and trends that can be addressed by O.R. approaches in the future. Underlining these methods is the need to conceptually model a system, identify the boundaries and capture complexity in terms of the connectedness between links and relationships and to deal with uncertainty.

We have started a discussion on social media to gain initial thoughts on the following questions:

- What are the key 'Grand Challenges' that we in the O.R. community should address?
- Which of the host of O.R. methodologies, tools and techniques should we consider using?
- How can we in the OR society promote and develop responses to address these challenges?

We're looking forward to a lively discussion.

¹http://www.britac.ac.uk/events/2015/Tackling_the_Great_Challenges_of_the_21st_Century.cfm

²<http://www.publications.parliament.uk/pa/cm201415/cmselect/cmpubadm/669/669.pdf>

³<http://www.gov.scot/About/Performance/scotPerforms>

⁴Midgley, Gerald and Reynolds, Martin (2004). Systems/operational research and sustainable development: Towards a new agenda. *Sustainable Development*, 12(1) pp. 56–64

<OR>

EVENTS WORLDWIDE

To see the full listing go to:

www.theorsociety.com/Pages/NonSociety/NSEvents.aspx



Learning and Development Programme

OR Society Approved Training Courses

THE SCIENCE OF DATA VISUALISATION

2 June, Birmingham

£615 + VAT for OR Society members

Hands on course

Course provider:

Ian Taylor, FlyingBinary

These days, we can all create charts with one click. It's easy - so why do they sometimes look so wrong? It turns out that we must respect ten thousand years of evolution, learn a new language, get to grips with core components and apply a structured process! During the day we will mix presentation, video, real published examples and workshop exercises to equip you for the exciting adventure that is modern data visualisation. You will learn:

How visuals are hardwired into our biology; Why some charts elucidate and some obfuscate; The six simple steps in the visualisation cycle; How to transform your interaction with decision makers; Why action must flow from every successful visualisation

FROM BIG DATA TO OPEN DATA

3 June, Birmingham

£555 + VAT for OR Society members

Course provider:

Ian Taylor, FlyingBinary

NEW FOR 2015

Big Data and Open Data will prove to be a game changer for those organisation that ignore the hype and use these advances to enrich the data ecosystems they currently use. As data specialists moving from the structured data world to the use of semi structured, unstructured and open data requires a new understanding of the landscape before we can begin to gain the value from these innovations.

We'll explain the strategic landscape of both new data areas, enabling you to assess how best to incorporate both to create new strategies. Exploring the use of these new data sources will prepare an organisation to move from an analogue data view of their data to a digitally enabled view.

What is Big Data and why does it matter; what is Open Data and why is it important; the challenges and opportunities of moving to a digital data landscape; learn about some case studies which have particularly added value to the organisation; next steps and innovations in this new data landscape

ACTIONABLE INTELLIGENCE

4 June, Birmingham

£555 + VAT for OR Society members

Course provider:

Ian Taylor, FlyingBinary

NEW FOR 2015

With the government now more committed than ever to increasing open-data sets and the growing presence of Big Data, there is increasing opportunity for organisations to establish a more data-driven decision-making process. Being equipped with the knowledge of how to extract maximum value from this information, organisations can transform the way they function – improving efficiency and effectiveness and creating a more evidenced based data culture across the organisation.

Actionable Intelligence will equip you with the strategies necessary for implementing effective, data-driven decision-making processes that improve the functioning of your organisation. Meeting the challenges posed by Big Data and utilising data to drive outcomes, this course will enable you to make informed, evidenced-based business decisions.

Make informed business decisions and design services through the effective use of data; Use Key Performance Indicators (KPI) to drive outcomes; Improve outcomes for service-users by improving efficiency and effectiveness; Establish an actionable intelligence culture within your organisation; Utilise data visualisation to create data driven decisions

HOW TO ENGAGE KEY STAKEHOLDERS IN YOUR

24-25 June, Birmingham

£1,200 + VAT for OR Society members

Course provider:

Brendan Hickling, Hickling & Associates

NEW FOR 2015

Learn how to conduct a rapid appraisal of a project to gain a clear idea of whom you need to engage with and how to do it in an effective and timely manner. If you're looking to bring people together and guide them through a process of effective discussion, you will benefit greatly from this course. You'll discover how to bring clarity to your project through the application of a simple appraisal tool, analyse the key issues and stakeholders, define your goals and plot your project.

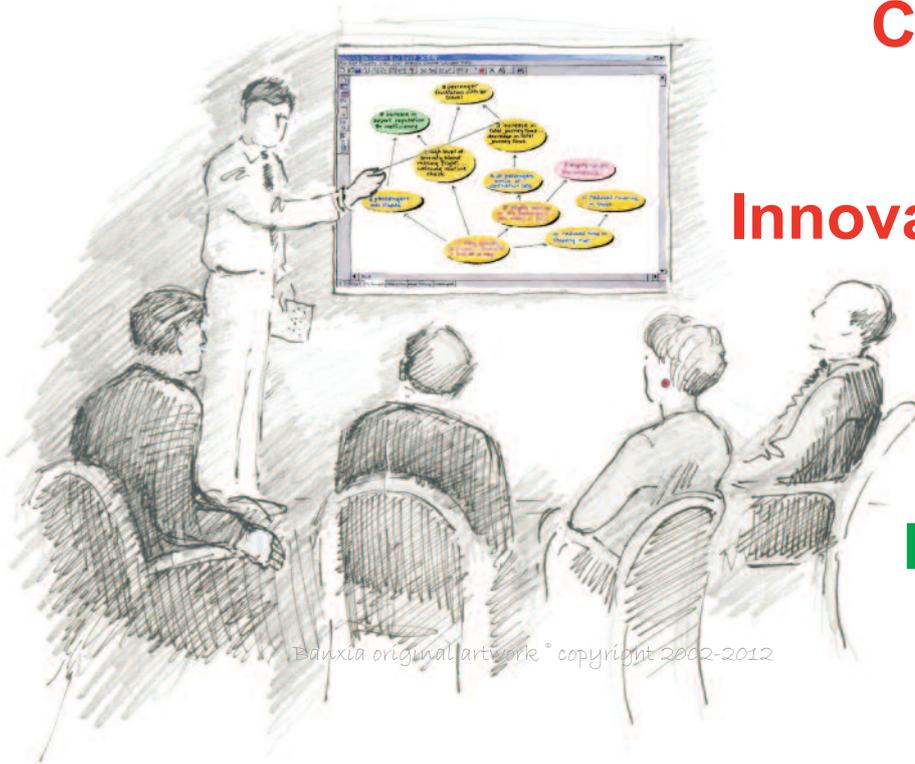
Start work immediately on a project of your own; Get input from peers that you can apply directly to your situation as well as expert guidance; Get stimulated and empowered by new ideas and tools; Understand what you will need to do in the following weeks and months

**For details of all courses and to book online, visit
www.theorsociety.com or call Jennie Phelps on 0121 234 7818**

Creative thinker?

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Equip yourself with the tools and techniques to develop and implement winning strategies.

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- **Connect™** - allows a group of people in the same location to collaborate in the entry of ideas around a topic, and then to organise them by preferencing, rating or otherwise evaluating them. Designed to support Visual Strategy Making alongside our Decision Explorer software, it is free to try it out, and supports up to 32 participants using tablets or laptops with any modern browser. Decision Explorer Connect starts at £99 + VAT for 8 participants.
- **Decision Explorer®** - an ideas mapping tool used to organise and structure an individual's or a group's ideas about a problem or issue. This is a piece of software with many uses, in areas such as strategic management, risk assessment, project planning/ definition and general problem structuring. Single user licenses start from £99 + VAT.

“Decision Explorer® has proven to be a powerful facilitative tool. Used ‘live’ in workshops it provides a very efficient and productive means of keeping participants focussed and communicating. As a means of joint decision making, I have not found better.” Kenny Forsyth, Consultant

- **Frontier Analyst® Professional** - a performance measurement tool, using Data Envelopment Analysis (DEA), to give a relative assessment of the performance of a group of business units. Used in organisations that have a network of branches/ depots or in situations where a group of similar “units” can be identified (for example, hospital wards, banks, shops, teams within a company and so on). Single user (75-unit analysis capability) licenses start from £195 + VAT.

Contact us for details of any of these products.

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SOFTWARE

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LINKEDIN + ANALYTICS = MORE POWER AND MORE PROFIT

LinkedIn, the social network which seems to be the one preferred by O.R. professionals, has taken a leap into the world of “user” analytics by adding new analytics services to its platform, to expand the ways people use it beyond looking for jobs and networking.

The screenshot shows the LinkedIn 'Specify a target audience' dialog box. The dialog has tabs for Company size, Industry, Function, Seniority, and Geography. The 'Industry' tab is selected, showing a list of industries: Construction, Consumer Goods, Corporate, Educational, Finance, Government, High Tech, Legal, Manufacturing, Media, Medical, and Non-profit. The 'Audience' section shows a grid of 12 profile pictures and the text '17,537 targeted followers (out of 17,537 total followers)'. Below the grid, there is a dropdown menu for 'Include' set to 'Employees and non-employees'. The dialog is overlaid on the LinkedIn 'Companies > LinkedIn' page, which shows navigation tabs for Overview, Careers, Products & Services, Follower Statistics, and Page Statistics. The page also displays a post from Richard Hirsch and various analytics charts on the right side.

By the time you read this, LinkedIn will be providing you with an analytics tool that enables its users to better track the traffic that their posts receive. If you are a user of LinkedIn, you will no doubt be familiar with its “Who’s viewed your profile?” emails and other alerts, well this new analytics add-on provides you with the ability to see who has “viewed your posts” too.

At its beginning LinkedIn was regarded by social media site observers as something of a slow starter, but in recent months the addition of self-publishing tool for all of its 230 million users who live in English-speaking countries has boosted its usage considerably. Currently the publishing tool accounts for the addition of more than 100,000 published posts per week, with more than 1.5 million posts on the platform overall.

For those who publish on LinkedIn, the new analytics tool will allow access to posts going back six months — a period that may well be extended if the facility proves popular amongst LinkedIn’s user base. However the facility to look beyond the current six month period of viewability may be marketed as a premium service - expect costs to rear their ugly head, if you expect to be able to access long and detailed histories going back more than six months.

Once in the post statistics dashboard of LinkedIn, keen analysts will be able to see exactly how many people viewed their accounts, liked and shared their posts, as well as which LinkedIn users took any action as a result of their posts – all good stuff and undoubtedly the very “fodder” that analytics is made of – wonderful!



MY FIRST PROJECTS

K.BRIAN HALEY- EMERITUS PROFESSOR OF OPERATIONAL RESEARCH , UNIVERSITY OF BIRMINGHAM

My introduction to Operational Research goes back over 70 years to January 1954.



Brian Haley left receives Beale Medal from OR President Richard Eglese 2010

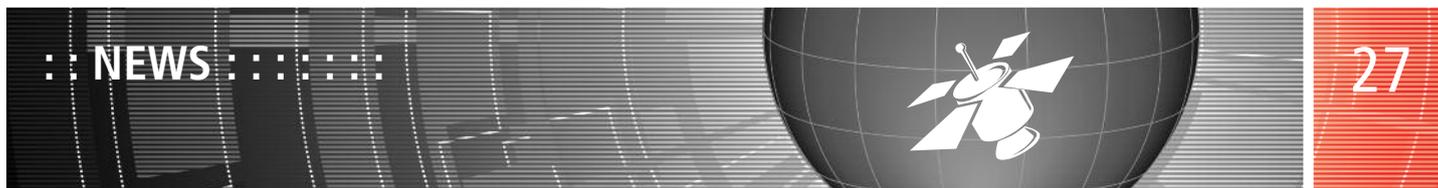
Eric Page, Colin Titmus and I were in the final year of a pure maths degree at the University of Birmingham when we saw a notice seeking students of maths to consider carrying out research into a new subject (O.R.) in the department of Engineering Production.

The year 1954 was very eventful for Operational Research. The subject had been recognised as a valuable contribution to a number of military situations and when the immediate needs of conflict were over, a number of the people who had been associated with O.R. groups found that civilian activities could also benefit from its practice. These practitioners had returned from military duties to either their former employment or in some cases to industries that had been privately owned and had been nationalised. Energy, coal, gas, electricity in particular were in continuous state ownership with steel changing from private to public several times. Some of the wartime O.R. staff joined these large groups and attempted to practice the concepts they had been using in the war. The oil industry was also a fertile home for several people. Many had kept in touch using the auspices of the O.R.Club which met regularly to hear a talk by one its members on their latest studies and experience. It was these talks that formed the basis of a journal The Operational Research Quarterly launched in 1950. The members of the club were concerned with defining what was O.R. and also finding that every study by one of its members could be classed as O.R. following the definition: 'O.R. is what O.R. workers do'.

Some of the original members, who had been academics, returned to their university appointments where they were able to publish much of the development work they had done during the war both in traditional scientific journals and in trade journals. Gradually some techniques emerged as being of value to particular industries or activities. In the 1950s there were only 20 Universities in the UK producing 17,000 graduates per year (just 3.4% of the population). Very few of these institutions had an interest or skills in any management activities. Day release and evening classes were however very popular.

1954 saw the end of wartime rationing, the first 4 minute mile, the first performance of Salad Days, the first performance of 'Rock around the Clock' by Bill Haley, the conversion of the O.R. Club to a learned and professional Society and the introduction of Brian Haley to Operational Research.

In January we met with Professor T.U.Matthew who had been employed by Tube Investments (TI) as a Production Engineer when the war started but was recruited to work in one of the military O.R. groups until he returned to become a director of TI and was seconded to form a Production Engineering Department at Birmingham. He maintained his interest in O.R. and membership of the Club serving for the first five years on the Editorial Committee. He had decided that there was a possible future in O.R. as a management service alongside Work Study, Method Study, Work do'.



Measurement, Organisation & Methods (O&M) and applied statistics. He had been running one and two week residential courses for several years and decided to include examples of new management methods. We were told that our research would involve working on new industrial problems and designing methods to improve the efficacy of existing procedures. Our interest was whetted but we had to wait until our graduation in June to have our applications approved before starting our research in the autumn.

In September we met with our supervisor, Frank Benson, who had just joined the University as a lecturer from being a statistician with the British Electricity Authority. It had been decided that the best way to initiate us was to give us specific real industrial problems. During the course of our research we were to spend about half our time working either on live industrial problems or in a day to day working environment. We were allocated different areas of study: Colin- work study and measurement; Eric- Queueing Theory and; I was given Linear Programming. Frank had set me an exercise which was to allocate the coal deliveries from a number of coal mines to several power stations which looked like a simple example of the LP transportation algorithm. This project was to continue for most of my three years as a research student with more and more features incorporated.

During the first year I spent 3 months at Thomas Hedley (now Proctor and Gamble) in Newcastle upon Tyne as a member of their O.R. staff and was given the task of optimising the blending of vegetable oils to make four grades of commercial cooking fats. This proved to be an ideal application of the simplex method which could be rerun when there was any change in the raw material. The summer period was spent at ICI (metals) working on an ongoing project involving the cutting of small coils of strip metal from wide newly rolled large coils. A comparatively simple adaptation enabled the paper trim formulation to utilise a transportation matrix. The team (who could not be called O.R. since the Director responsible for Work Study did not like the name), was based in London but had acquired a caravan which they would install on the car park of the factory where they were working which meant we had day to day contact with the operating staff and could try out any tentative solution and produce a system which took account of all of the special aspects of the problem. At that time there were over 800 coal mines and 200 power station sites in the UK but my example was restricted to 4 mines and 3 power stations. Nowadays it would be assumed that the large problem could be solved by turning to the computer but at the time the most advanced equipment was an electric calculator which could not multiply three numbers together without the user writing down an intermediate step.

Some four years later when I was working with the National Coal Board I had the opportunity of tackling a 50 by 700 problem but the only machine capable of solving it was in the United States and required a set of punched cards to be shipped both ways which added two weeks to the run time. A number of researchers had been working to improve the speed of the simplex method and, using a variety of tricks, a team was able to find an optimum solution manually in less than a fortnight.

The only available published work in 1954 was the original articles

in a Cowles Commission Monograph by Koopmans and Dantzig in 1951. These articles provided the basis for the Simplex and the Transportation Methods and I spent the autumn in attempting to apply the techniques to my problem. During this period we were included in weekly works visits designed to introduce us to the working of industry and we took part in case studies with the students from the newly started M.Sc. course in Engineering Production. The first M.Sc. course in Operational Research in the UK started in Birmingham in 1958.

With the help of the O.R. Club a two week residential course in Operational Research was planned to take place in early December and I was asked to contribute a lecture on linear programming using my small problem as an example. Several members of the Club (including, Beer, Pennycuik, Purdom and Swan) which had, by that time, become the Operational Research Society also made contributions and attended for the whole period. One of the 30 delegates who was based in the Midlands division of the Central Electricity Authority saw the potential of LP and asked me to undertake a study with him to apply LP to his region's coal distribution problem.

The division identified 10 power stations that were being supplied from 70 coal mines and efforts were made to identify and collect relevant data. It soon became apparent that the problem was not an exact fit for the Hitchcock-Koopmans transportation model and Dantzig's method needed modification. Some of the difficulties encountered were the lack of data on costs which could not be easily obtained, the difference between coals from the different mines, variation in weekly demand and supply leading to an imbalance between total available and that required, also there were several different modes of transport (road, rail and canal) with different unloading capacities. The existing practice required a weekly schedule to be compiled which was subjected to modification due to day to day emergencies. The computational effort did not permit a rerun of the model on a weekly basis. However it was possible to produce a 'solution' to the model and to identify the modification required. These results were presented to a specialist course for the Electricity Authority in May 1955. By the beginning of the following year the authority had set up an O.R. Group in each division and the midlands group took over the implementation of my efforts. They too were hampered by the lack of suitable computer power and the efforts of the team were designed to cope with the need to speed up the hand calculations. John Stringer was the head of the head quarters O.R. Group and he was instrumental in producing our joint paper which was read at the first international conference in O.R. held in Oxford in September 1957.

I consider myself to have been fortunate to have met and worked with many of the founders of O.R. and to have learned from them the nature of the subject. It was absolutely vital that any solution we offered to a problem was within the scope of both the people who had to make our methods work on a day to day basis and the technology available at the time. I had been required to keep the sponsors aware of results as they became available and to tailor methods to suit the existing management capabilities. Without doubt, 'O.R. is getting the best out of the available resources'.

SPECIAL INTEREST GROUPS

CRIMINAL JUSTICE

CONTACT: Ian Newsome

TEL. DDI: 01924 292244 **Extension:** 22244

EMAIL: ian.newsome@westyorkshire.pnn.police.uk

CJ SIG Summer Meeting and AGM 2015

Date/Time: 5th June 2015 @13.30- 16.30

Venue: Central London

Speaker: Selection to be confirmed

Our next meeting will be on June 5th in central London from 1.30-4.30 approx.(with our brief AGM at the start). Once again we are aiming for a mix of interesting talks across the CJ spectrum, including one on resource allocation by formula by Paul Hewson from Plymouth University.. See our website for up to date info: http://www.theorsociety.com/Pages/SpecialInterest/CriminalJustice_future.aspx or contact suemerchant@hotmail.com

DEFENCE

CONTACT: Noel Corrigan

EMAIL: noel.corrigan@baesystems.com

CHAIR:

Alan Robinson

Chief Scientist, PCS Dept,

Defence Science and Technology Laboratory (Dstl)

Portsmouth West, Portsmouth Hill Road,

Hampshire, PO17 6AD

TEL: 02392 53 2839

EMAIL: arobinson@dstl.gov.uk

Defence Special Interest Group

The Aqua book – implications for Defence Analysis

Date/Time: Wednesday, 17 June 2015 14.00-17.00

Speaker: Nick Harris, Dstl; Alec Waterhouse, DECC; Paul Pearce, Dstl

Venue: Park Centre, Farnborough Aerospace Centre, Farnborough, Hants

Our next event will be a half day workshop to explore the implications of the recently published Aqua book (Analytical Quality Assurance). This provides guidance on producing quality analysis for government. Following the Macpherson review of quality assurance of government analytical models, a cross-departmental working group on analytical quality assurance was established. The Aqua Book is one of their products and is a good practice guide to those working with analysis and analytical models.

Dstl and DECC were key contributors to the group developing the guidance, and we are fortunate to have them to provide the background to the book to stimulate the workshop. In addition, Dstl is currently developing an evidence framework to support the design and assessment of appropriate provision of evidence to decision makers in the MOD. This event gives you the opportunity to help shape the way the Aqua book is implemented in the defence

arena, and understand what will be required of defence analysts in supporting government decisions.

The format for the session will be a set of short briefs on the background to and content of the Aqua book. This will lead to syndicate sessions where different aspects of the implications will be discussed in small groups. There will be a period of plenary feedback and a final wash up. The aim of the debate is to identify what the defence analysis community should be doing to fully exploit the guidance provided, and also identify what further guidance would be useful. A full agenda for the session will be issued closer to the day.

The formal meeting will be preceded by a General Meeting of the Defence Special Interest Group, which will include the election of Officers.

Refreshments will be available.

Spaces are strictly limited: if you would like to attend please express your interest before June 10th by contacting either Louise Maynard-atem (louise.maynard-atem@baesystems.com) or Lee Goodman (lgoodman1@dstl.gov.uk)

O.R. AND STRATEGY

CONTACT: Frances O'Brien

TEL: 02476 522095

EMAIL: Frances.O'Brien@wbs.ac.uk

Second Workshop on Developments in Scenario Planning

Date/Time: Wednesday, 03 June 2015 at 10.00-16.00

Venue: Shell Centre, London

Speakers: Various

FREE EVENT OPEN TO ALL

Following a very successful event at Warwick Business School last June, this one day event will feature presentations and discussion about latest developments in academic research and practice relating to scenario analysis. It will feature speakers from a number of leading corporate practitioners of strategic foresight, as well as top academic researchers in this field.

Current Speakers include:

- Stefano Scuratti, Economist Intelligence Unit
- Shell Scenario Planning Team (TBC)
- Gerard Hodgkinson, Warwick Business School
- Brad Mackay, Edinburg Business School

Other speakers will follow.

If you have any queries about the event

Please email Frances O'Brien at frances.o-brien@wbs.ac.uk
If you are a BAM member please email Maureen Meadows at



SOCIAL MEDIA MONTHLY FAVOURITES



What's hot on Twitter from @TheORSociety community of 1,502 followers...

<p>Vicky Forman @vickykf May 13 Only one month until the abstract submission deadline for #YOR19, time to get thinking on what you want to present. @TheORSociety</p>	<p>#CharityHour @CharityHourUK Apr 15 Today #CharityHour pick @TheORSociety provides training, conferences, publications & info to those working/interest in Operational Research.</p>	<p>Frances Sneddon @FrancesSneddon May 6 Get your free copy of the @TheORSociety new analytics in action magazine http://www.getimpactmagazine.co.uk #orms #analytics #datascience</p>
<p>IBM Big Data @IBMbigdata May 13 Do you have the #analytics talent you need to lead the #data revolution? http://dy.si/mXmL</p>		<p>GradQuiz @GradQuiz Apr 28 See your career take off with British Airway's Operational Research programme: http://bit.ly/1kD0tDk</p>
<p>Tony O'Connor @TheTonyO Apr 22 @BridieSmith been a data scientist for nearly 30 years. It's just the data's got bigger and the science's got better #GORS @TheORSociety</p>	<p>Felicity McLeister @FMcLeister May 10 New blog: How O.R. provides 'Services to Young People' http://ow.ly/MA7pP @TheORSociety #ORBlog #ProBonoOR #ThisisOR</p>	<p>Andy Harrison @baldie_andy Apr 14 2 days in Glasgow planning @euroconf2015 - 2k+ papers from 80+ countries http://euro2015.org/ @euroconf2015 @TheORSociety #ORMS #ThisisOR</p>

Who the OR Society is following this month on twitter:

 <p>Louise Maynard-Atem @LMAtem Consultant @ CORDA, Monthly contributor @ Inside OR, All thoughts/rants/ramblings my own</p>	 <p>Ruth Kaufman @ruth_kaufman Interests: social justice, human rights, rational analysis, third sector</p>
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The OR Society on LinkedIn: join the 3,323 members who do so ...



Grand Challenges for O.R.
Jane Parkin , Associate Faculty at Leeds University Business School



Jane seeks to obtain some responses on the *Grand Challenges and understanding how we as an O.R. community should tackle these?* This is an important question and one in which Jane and Miles Weaver wish to debate further as part of a 'Making an Impact' session at Euro 2015. They would be delighted to see a large and active audience debating this issue; providing some perspectives on how we in the OR society should promote and develop responses to these challenges. One of the other questions posed includes the *host of O.R. methodologies, tools and techniques that would be most appropriate to address these grand challenges? That's if you think it's worth debating*

Giles Hindle has already pointed to systems dynamics modelling around "limits to growth" as a good example. Samuel Gordon raises the need to "achieve world peace", with particular reference to using decision-making analysis to model symbiotic decision-making. He suggests there is little work on this but provides a very useful link to a short paper he has produced as a starter for ten. *We will publish highlights of this discussion in the next issue of Inside O.R.*

We look forward to building on Giles's and Samuel's contributions over the coming months and hopefully hear your views at the Make an Impact session. *Plenty of time to get thinking about it!*



30 min with a games theorist?
Samuel Gordon, Research Analyst at the Association of Graduate Recruiters



Samuel is seeking a game theorist for a chat to help him write a short paper on modelling symbiotic behaviour, showing how to predict co-operation in the Prisoner's Dilemma. This is what is great about our LinkedIn group – nurturing new and meaningful connections. *Can you help Samuel?*

Why not join us on Twitter, LinkedIn or Facebook
www.theorsociety.com/FollowUs
Get tweeting and posting: Your contribution might be featured next?

Careers Open Day 2014

Exhibitor booking
now open



The Open Day will be held at
Millennium Point, Birmingham
on Wednesday
18 November 2015



Early Bird booking

Reserve a stand by 31 July 2015 for £290 +VAT
(£330 + VAT thereafter).

Price includes lunch and refreshments, monthly feature in Inside O.R. up to the event and a follow up article, and a profile on our website. Confirmed exhibitors will be promoted to students prior to the event.

To reserve a stand please email your full contact details to Louise Allison, louise.allison@theorsociety.com

Find out more online at www.TheORSociety.com/CareersOpenDay

WHERE ARE THEY NOW?

The following members on the Society's mailing list have recently had their mail returned to the Membership section, presumably because they have changed their address.

Would any member who is currently in touch with them please ask them to email Carol.Smith@theorsociety.com advising us of their current whereabouts so that we can update our database and return to a speedy and efficient service.

Michael Allen

Rochester USA

Patrick Stribley

Hertfordshire

Jamie Pinfield

Hants



PERSONAL PREDICTIVE ANALYTICS

NIGEL CUMMINGS

Personal Predictive Analytics is now influencing our lives at a ‘personal’ level, and it’s not as bad as Science Fiction sources would have us believe.

The 2002 film *Minority Report* introduced us to a dystopian connected future in which predictive analytics would be used to identify, arrest and prosecute killers before they committed their crimes. That was science-fiction, but 13 years on from that film, research in the real world has developed predictive analytics to the point where it can at least, indicate where crimes are likely to be committed in our communities.



Pinpointing individuals before they commit crimes has yet to become reality, but anticipating (and influencing) individual needs is developing rapidly. Such analysis can be useful in supply chain planning for keeping leaner inventory and for promoting goods that customers might not even know they want or need. Predictive analytics can be used to influence humans, especially when it is applied to data derived from customer loyalty programs, big data and cloud computing. You only have to attend one of our Analytics summits to hear about the power and influence that modern day analytics can exert upon our lives.



Our most recent summit (BMA, London, 29 April, 2015) featured input from the likes of Clive Humby (Starcount.com) a man oft referred to as the ‘founding father of the loyalty’ card, his work with the Tesco Club card loyalty program is legendary.



It also provided a platform for Sanjeevan Bala (Channel 4) to inform us about the use of real time analytics in segmenting and influencing customer choice during Channel 4 Video on Demand (VoD) presentations. Their presentations at the 2015 summit will feature in forthcoming issues of *Inside O.R.* and the videos associated

with them will be available to view and download via our website soon.

The continuous collection of data from disparate sources such as sensors, loyalty cards and IOT enabled retail installations will not cease, it is a valuable resource for increasing revenue streams and influencing customer decision making processes – it allows analysts to predict our needs, even before we are aware of having such needs.

Companies like Amazon have been using predictive analytics for years to influence customer behaviour and improve revenue streams, but Amazon’s use of predictive analytics has ramped up in recent years and become essential to the companies’ development of same day and even 30 minute package delivery.

Predictive analytics can reduce the time stock has to be kept in warehouses by predicting when and what customers’ needs are likely to be

It can be applied to data that describes the behaviours of large groups of decision-makers (buyers), but it can also go beyond this and drill down to the individual customer level. Today it is routinely applied to individual customer profiles, to help retailers establish stock levels needed to support its customers personal needs and buying patterns and to influence customer choice by providing ‘personalised buying options’.

Personalised predictive analytics of social media data streams, social media influence factors, customer interaction with Video on Demand (VoD) and ‘smart TV’ program content your purchases could be literally winging their way to you within 30 min. (Of course you could always walk to the local convenience store and buy it over the counter in less than 5 min and you might even get a bit of free exercise thrown in. Although, of course, you may get arrested for shop-lifting if in your eagerness, you have left home without your flexible friend!)

CUBAN HEALS?

NIGEL CUMMINGS

Cuba, the largest island in the Caribbean and home to 11 million people, was until 1959 one of the wealthiest and most advanced countries in Latin America but that was all before Fidel Castro and communism.

A very large proportion of the country's businesses are state owned including most of the hotels. For most of that time, the USA, which is only 90 miles to the north, has had no diplomatic relations with Cuba – no trade and US citizens have not been permitted to visit the country.

In the last few years, tourism has started to pick up again. In 2014, 2.8 million people visited the island, roughly half from Canada and the remainder mainly from the EU. It is very likely that within the next few years the United States will lift its embargoes. If this happens, it is expected that the number of tourists will almost double in the first year alone.

The Cuban government is acutely aware of the revenue generated by foreign tourists and it wants more, much, much more. To get increasing numbers of tourists to experience Cuba it also realises that it needs to make its attractions more compelling and, hopefully, more profitable. This has stimulated an interest in analytics which could process the data generated by visitors on social networks and quickly identify problems at government-run hotels and tourist facilities.



Because of the existing ban on American companies supplying technology to Cuba, it was not possible to enlist analytics services from America, so 'Havana' had to look somewhere else and found SocialVane, a small Spanish company on the island of Menorca, which had previously been working with the local Menorcan tourist sector to analyse issues, trends, and potentials of the tourism industry there.

The SocialVane analytics platform provided for Cuba however, has been specifically designed by tourism analysts for the country's public administrators, to monitor and help make decisions about the health and challenges faced by its cities, tourist operators, and the overall tourist sector.

SocialVane's analytics platform was initially 'piloted' in Cuba with just a handful of hotels, but the Cuban government quickly saw the potential and the benefits afforded by its analysis, so it decided to run the platform at a national level.

SocialVane analytics provides monitoring and analysis of data received from Cuban hotels and tourist establishments, as well as all social media chatter in the main tourist locations. It also collects all mentions of Cuba in social networks and all mentions of Cuba's competitors. Then in the analysis phase, categorises and segments that information.

Using the platform, Cuba has a much better overall view of what is happening in the region. The Cuban government has recognised the power of analytics and is employing it in other areas as well including the management of trade show and conference facilities. However challenges remain. Cuba is a low tech nation - internet averages 1.6 Mbps countrywide and penetration is very low at around 5%.

While the thaw between the US and Cuba is well underway, Cuban government officials realise it may take years for relations to fully normalise. Analytics speaks a universal language though, and in no small part, it may be responsible for a more rapid thawing of the relationship, as Cuba strives to gain more dollars and improve its commercial infrastructure.

<OR>

'The Cuban government is acutely aware of the revenue generated by foreign tourists and it wants more, much, much more.'



THE RISE AND RISE OF SOCIAL MEDIA

LOUISE MAYNARD-ATEM

I noticed in a recent issue of Inside O.R. that a page dedicated to social media has been introduced, alerting members to the latest goings on across all of the Society’s social channels with a particular emphasis on twitter, which gave me the idea for this month’s article.



Figure 1: Twitter Analytics Dashboard

Social media really has changed the way we communicate and how we receive information, I will openly admit to checking my twitter/facebook/instagram feed at least once each on my way to the office every morning. Given that many of us are creating so much content on topics as far ranging as our political views to what we had for breakfast this morning, it makes sense that the analysis of this data could provide very valuable insights.

This month I’m giving you an overview of **Social Media Analytics**, what it is, how it’s currently being done and what it might mean to those of us in the business of analysis.

Get in touch with me on the usual email address if you have any thoughts on this month’s article or if there’s anything else you’d like to bring to my attention(lmaynardatem@live.co.uk); as always, I look forward to hearing from you.

Social Media ‘Analytics’

So what exactly do I mean when I use the phrase Social Media Analytics; **Social Media Analytics** is the process of gathering data from stakeholder conversations on digital media and processing it into structured insights leading to more information driven business decisions and increased customer centrality for brands and businesses. This branch of analytics is particularly powerful in consumer driven industries because it allows for

capture of consumer data which can lead to prediction of behaviour and customised marketing campaigns by identifying new patterns and trends in consumer habit.

There are obvious synergies between social media analytics and other areas of O.R. including forecasting and data mining but also between other business areas, particularly marketing.

Twitter

When it comes to social media analytics, the micro-blogging site is probably the first place that springs to mind. Twitter content is regularly used to gauge public feeling on specific issues in the news; for example in this year’s election there were several thousand tweets per hour on election night and the hashtag #GE2015 was trending across the UK throughout polling day.

In terms of analytics – many industries are seeking to track their brand growth, visualise social demographics and measure sentiment metrics in real time to see what types of content resonate most strongly with their customer base/relevant stakeholders. Twitter have recently introduced an accessible dashboard of their own (Figure 1) that allows users (both individuals and corporate accounts) to see how many interactions and engagements specific tweets receive.

Facebook

Facebook offer a feature called Audience Insights which allows you to learn more about your target audience with respect to the comparison audience (which is the entire Facebook population of the UK). It will also provide demographic based information, for example age and gender; most interesting though, Facebook partner with trusted data sources that provide additional information on purchase behaviour, household size and household income amongst other details. This data is usually updated on a daily basis, and so offers the most current information and is constantly revising any patterns and trends that may exist in the data provided.

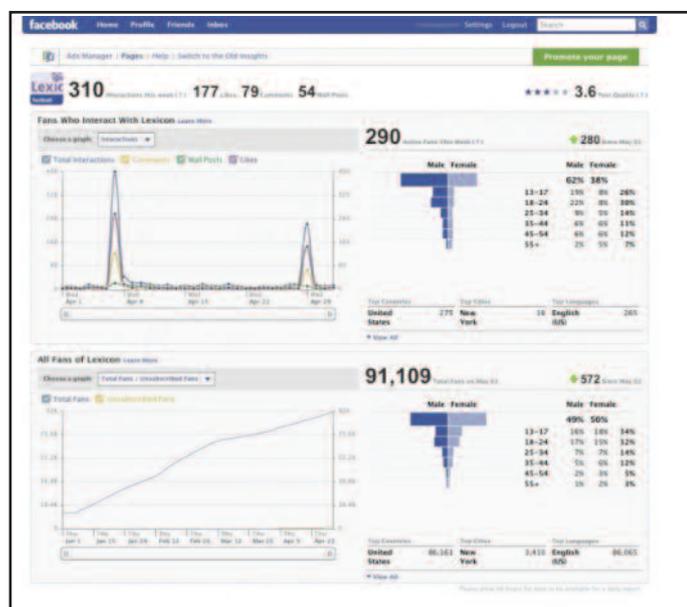


Figure 2: Analysis of Facebook Audience Insights Data

Google

Unsurprisingly Google offers an analytics tool (Figure 3) that is very easy to use and allows users to turn the insights that they gain from various forms of social media into actionable solutions for their business.

Another great feature of the Google offering is the Analytics Academy, where you can view lessons from experts, test your

knowledge and become a part of the learning community. There are some really useful courses available including 'Ecommerce Analytics: From Data to Decisions'.



Figure 3: Google Analytics Dashboard

#SoWhat

So what does any of this mean to O.R. professionals, if anything at all? Well, as analysts, I don't think it would be wise for any of us to ignore any significant developments in data analysis, and whilst the type and volume of data may be different to what we're used to dealing with, the techniques used for analysis are much the same.

For those of you already working in consumer driven environments, or those who are looking to go into such areas, it is likely that you may end up dealing with these types of data on a regular basis so it would be beneficial to understand how you can interpret the information and turn it into something more meaningful and potentially profit-generating.

It's not just consumer driven markets either, if the recent general election campaigns are anything to go by – social media has a big part to play in understanding the feeling of the nation from a political perspective and being able to accurately tap into this could make all the difference. Part of President Obama's success in the 2008 presidential elections was attributed to his particularly savvy online and social strategy; this is certainly not an area to be ignored.

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Visit: www.analytics-network.com

REGIONAL SOCIETIES

SOUTHERN OR GROUP (SORG)

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SORG : The Impact of Pricing Decisions in a Business-to-Business environment

Date/Time: Friday, 17 July 2015 at 14.00-15.30

Venue: Playfair Library, Old College, South Bridge EH8 9YL Edinburgh

Speakers: Christopher S. Tang

Abstract: We examine the impact of pricing decisions in a B2B environment. Because the scope is broad and relevant literature is scant, we shall examine this issue in two specific settings. We first examine how discount pricing concessions can create the 'bullwhip effect' in the MRO (maintenance, repair, and operations) industry and discuss how to mitigate the bullwhip effect. Then, we discuss how uncertain spot price market in the ocean freight industry has triggered customers to demand carriers to offer 'price matching.' We examine the impact of price matching mechanism on the carrier.

Registration for this event is at <http://www.business-school.ed.ac.uk/about/events/54c8d74726382ce0492f8d93/the-impact-of-pricing-decision>

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: Sarah Fores

EMAIL: sarahfores@gmail.com

CONTACT: Jane Parkin

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Joint YHORG RSS Meeting

Health Analytics: Use of Statistics and O.R. in a health context

Date/Time: Tuesday 2 June 2015, 4-6pm

Venue: Sheffield University, room 2502, Hicks Building

This joint event between the Sheffield branch of the RSS and the Yorkshire and Humberside group of the O.R. society is designed to showcase and discuss the use of both Statistics and O.R. in a health context. There will be 2 talks: Sophie Whyte from the School of Health and Related Research (SchHARR) at Sheffield University is an O.R. analyst and Joanne Dalzell and Graeme Connor (Department for Work & Pensions) are statisticians working in the Government Statistical Service. Afterwards there will be an opportunity to discuss how Statisticians and O.R. analysts can work more closely together to deliver improved health analytics.

Using mathematical modelling to inform policy making for early diagnosis of bowel cancer

Sophie Whyte, SchHARR

The early diagnosis of cancer is a topic with the potential for large

impacts in terms of saving both money and lives. Understanding of cancer progression rates is limited and the use of clinical trial to determine optimum screening strategies is often unfeasible. Hence, mathematical modelling can be extremely useful to inform policy making in this area. A summary of results from several studies using the SchHARR bowel cancer screening model will be presented. Challenges of modelling in this area will be discussed including differences between model predictions and real world observations, and modelling several interventions simultaneously.

Sophie has worked since 2007 as a mathematical modeller within the Health Economics and Decision Science section of the School of Health and Related Research (SchHARR) at Sheffield University. She has significant expertise and experience in three related areas: natural history model calibration, early diagnosis of cancer, and the evaluation of diagnostic tests.

Personal Independence Payment - using data to deliver a range of quality analyses and advice at pace.

Graeme Connor and Joanne Dalzell, Department of Work and Pensions

Personal Independence Payment (PIP) was introduced in 2013 to replace Disability Living Allowance for working age claimants. The analytical team that support this have been involved from day one in shaping the benefit policy, forecasting expenditure/savings/caseload, reviewing operational capacity, reporting management information, publishing official statistics and evaluating the benefit process and outcomes. All of these have involved a range of analytical techniques and processes, using skills across the different analytical professions. This work has been underpinned by a sound evidence base and a new atomic data store that captures real time data for PIP. This presentation will guide people through how data can be used for a range of analyses in order to deliver quality outputs and advice at pace to support Ministers, policy makers and operations.

Joanne has worked in the Government Statistical Service since 2000 and has worked on a range of areas relating to both health and benefit analyses. Her current role within the PIP team involves the production of official statistics and management information, modelling of health professional provision and backlogs in the system, and forecasting benefit savings/policy cost modelling. She co-manages a team of statisticians, operational researchers, social researchers and economists.

Refreshments will be available from 3:30pm. Details of the location can be found at: <http://www.sheffield.ac.uk/visitors>.

Please contact James Crosbie on jamescrosbie@hotmail.co.uk to book a place.

OR-30

June 2015

And now for something completely different!

Fendon Robb set out to prove scientifically, using Popperian standards that 'large human organizations are living systems' and in doing so raises some interesting and in some ways worrying questions. I will quote from his paper but obviously, I can only pick out bits so I strongly recommend going to the original if you find any of this interesting.

'If this hypothesis [that large human organizations are living systems] were found to be a 'better' theory of human organizations than those currently held, then certain world views follow. In particular, human organizations would be seen, not as being purpose-built by humans to perform a service to the community or to individuals in it, but as biological entities living on a substrate consisting materials, energy and human beings. These organisms would be seen as competing for material, energetic and human resources in order to maintain their own self-production,

'Whereas it is commonly believed that human organizations are within human control, this hypothesis puts this belief into question. Human attempts to control these organizations may be perceived by them simply as perturbations to which they should adjust in

order to continue their own self-production unabated. The hypothesis thus implies that managers are more like process workers than controllers: indeed, it may be questioned whether or not they exercise any control at all over those mechanisms of the organization which direct its self-production. If indeed this be the case then humans should be more than apprehensive because those organisms share nothing in common with human aspirations, and their behaviour reflects nothing of human intention.

[...]

'The hypothesis [...] could be falsified by observation that some large organizations do not behave as if to preserve their own self-production. It is therefore a scientific proposition in Popper's sense. If, having survived such a test, it is established as a 'better' theory, then some of its implications should lead to a Kuhnian paradigm shift with consequential changes in the context in which managers perceive themselves to operate. More importantly, the theory would lead to a radical re-appraisal of the relationship between humans and the social institution they inhabit.'

Robb, Fenton F. (1985), Towards a 'Better' Scientific Theory of Human Organizations, *JORS* 36.6 Pp 463-466 (jors198581a.pdf)

<OR>

OR-20

Lack of O.R. snookers Jimmy White

I read Lyn Thomas's article on the use of O.R. in leisure during one of the tea breaks of the World Snooker Championship, and as it happens, on the previous evenings I had been using a spreadsheet to satisfy myself on a particular point in snooker matches. It is well known that long matches favour the best players, but I had wondered how significant the length of each round might be. Disregarding the factors which can influence a player's chances during the course of a match (in particular the 'confidence factor'), the problem is a simple binomial one, and for those with the inclination to scour the record books, quite reasonable assessments should be possible for individual players. I wished only to get a rough overall idea and made the assumption that all players were of equal quality except for one, who probability of winning a given frame was 'p' (>0.5). I also assumed that all rounds in a match were of equal length; although inaccurate, this assumption does not have a massive effect on the answer. It is then easy to calculate that if the best player has say $p=0.55$, his chances of winning 5 rounds played to the best of 9 frames (typical of many of the lesser championships) is 9%, but rises to 16% for the best of 25 frames (typical of major championships). For a player with $p=0.75$, the probabilities are 78% and 98% respectively.

Long matches favour best players

Of course, it is grossly inaccurate to assume that all competitors except the best are of equal quality. A more realistic assumption would be that a top player has something like the following frame winning probabilities in successive rounds – 0.95, 0.85, 0.75, 0.65, 0.55. With this pattern, the best player would have a 49% chance of winning the championship with 9 frame matches, but a 65% chance over 25 frame matches.

Near invincible champions

Two other thoughts occurred to me. Firstly, if the world championship had continued on the challenge basis on which it operated during some of the pre-Reardon days, it is likely that the era of almost invincible champions (Joe Davis, Fred Davis, John Pullman) would have continued. The 9% and 16% probabilities mentioned above rise to 87% over a single 125 frame match. Probably, Reardon would have been undefeated throughout the '70s, Steve Davis in the '80s and Hendry in the 90s, with only John Spencer having a realistic chance of pinching one off Reardon, and only Jimmy White (subject to the next comment) with a chance against the other two. Secondly, having groaned at the Jimmy White strategy at least a dozen times during the current year's



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For an informal discussion in total confidence on any of these positions or the market in general, please contact: Teresa Cheeseman, Kate Fuller or Mark Chapman. Alternatively visit our website to view our current vacancies.