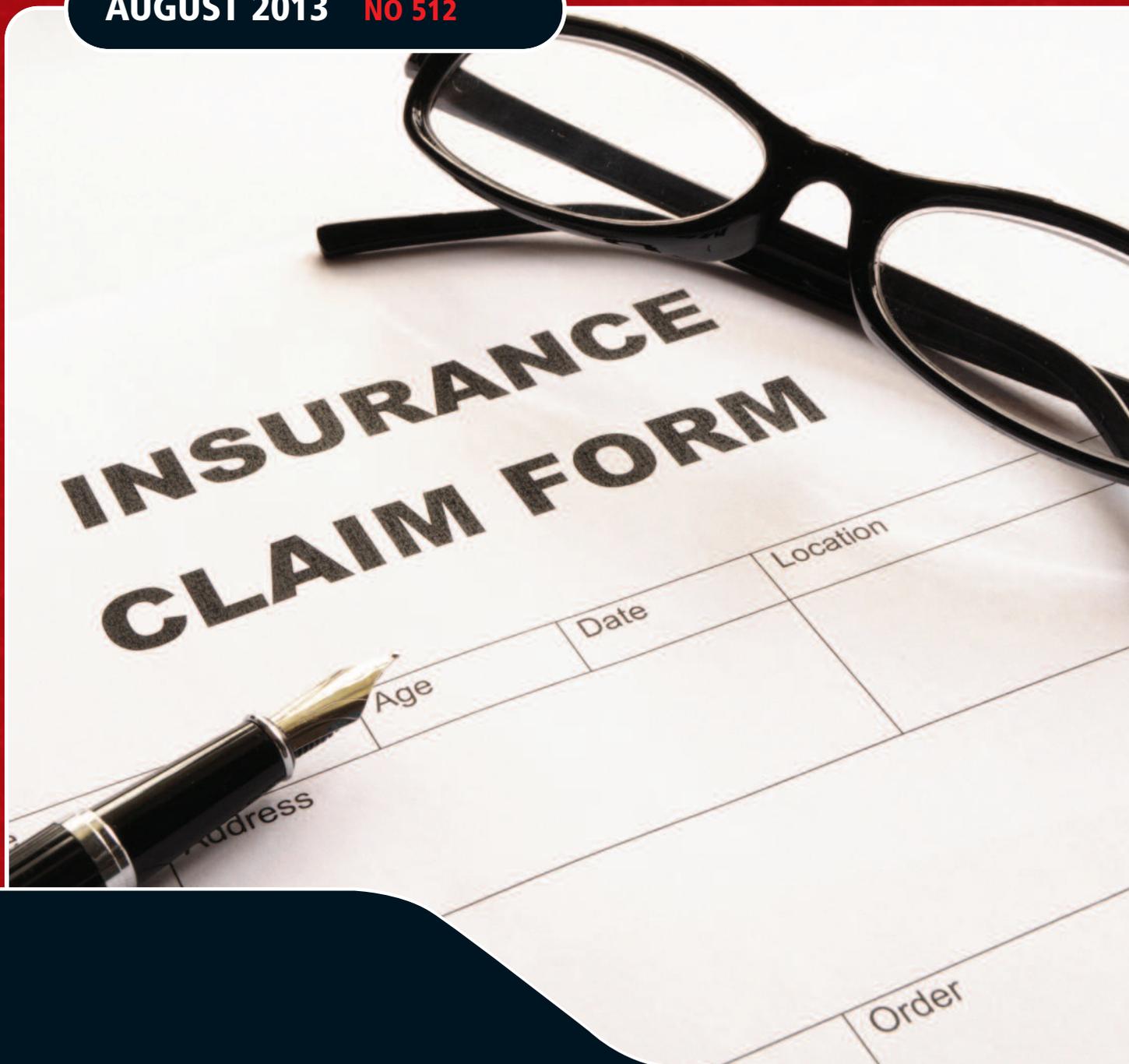


THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

# INSIDE O.R.

AUGUST 2013 NO 512



## NO CLAIMS, NO GAINS!

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

WHY TWEET – AND HOW DO YOU DO IT?  
TAKING MATHS FURTHER  
YHORG TUCK INTO CHILDHOOD OBESITY  
WIN FRIENDS AND INFLUENCE ADVERTISERS



THE OR SOCIETY

[www.theorsociety.com](http://www.theorsociety.com)



# ADVANCE YOUR CAREER PROSPECTS

## Accreditation: What it is and why you should apply

The OR Society's accreditation scheme enables members to enhance their career prospects by providing credible certification of their achievements in the field of Operational Research.

There are three categories of accredited membership:

**Fellow (FORS)** - for high achievers with at least ten years' experience

**Associate Fellow (AFORS)** - for those with a successful track record over at least five years

**Associate (AORS)** - for suitably qualified recent entrants

**Candidate Associate (CandORS)** - for those either completing a degree with a substantial O.R. content or starting their first employment in O.R. Candidate Associates are appointed a mentor to help guide them through the first couple of years in their O.R. career.

The substantial benefits of this recognised professional achievement include:

- an enhanced CV and post-nominal letters
- help in securing a job by demonstrating experience
- career progression through category upgrades

For full details of the Accreditation scheme, including criteria for each category and procedures, visit

[www.theorsociety.com](http://www.theorsociety.com)

### :: NEWS ::

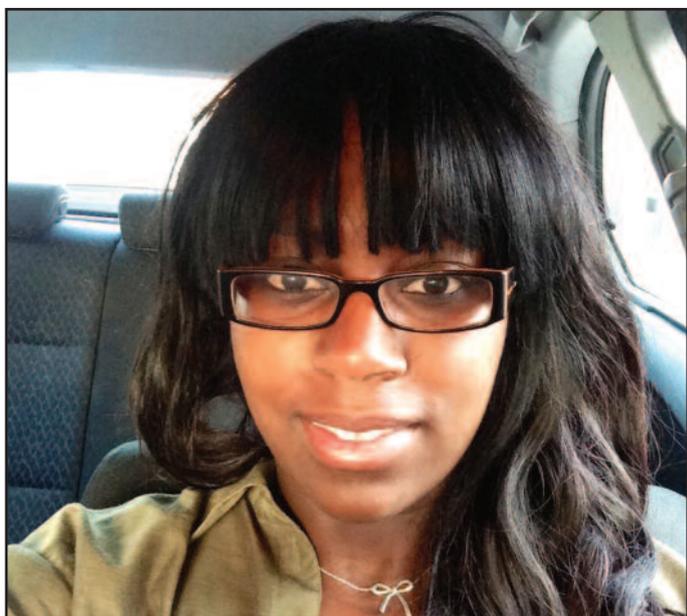
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## INTRODUCING THE 'EARLY CAREER'

**LOUISE MAYNARD-ATEM**

Hi! My name is Louise Maynard-Atem, I'm a relatively new member of the O.R. Society and in April of this year I began my first O.R. role as an analyst in the Department of Health as part of the Civil Service Operational Research Fast Stream program.



I've always considered myself a highly numerate person having studied undergraduate and postgraduate degrees in chemistry and polymer materials respectively, however I realised towards the end of my PhD that a career in the lab wasn't quite right for me.

I have to confess that I hadn't ever come across the term 'operational research' before the summer of last year but found myself using a number of key O.R. techniques, such as experimental design and modelling/simulations, during my time in research. Further investigation into these topics revealed the world of operational research to me and, as I imagine is the case for those of us with a non-O.R. background, I had been regularly practising O.R. techniques without any idea that I was doing so. The sheer vastness of the field drove me to pursue a career in operational research and

now here I am, almost a year later, three months into my new role as an O.R. analyst. It's been a fantastic experience so far, albeit a very steep learning curve. I've already started using a range of soft and hard O.R. techniques and I feel there will be scope to use many more during my time in government.

In June's issue of Inside O.R., John put out a call for a member of the community to take charge of a new page/section of the magazine geared towards enhancing and maintaining engagement with a wider audience, particularly younger members - a sort of 'by young members, for young members' segment, and I thought it would be a great way to actively involve myself in the operational research community. I've always had an interest in the world of journalism and publishing so I thought this would be a great way for me to combine a new passion with an existing one.

The purpose of this section is to appeal to and address issues facing young O.R. members including (but not limited to) career guidance - where to find it and how to implement it, a 'day in the life of...' section highlighting the many and varied fields where young analysts are making a valuable contribution, and bite sized tutorials on different techniques that make up the O.R. toolkit alongside examples of real-life scenarios where these techniques are being used.

I'm also very keen to hear from you; as young members of the OR Society, what would you like to see appearing in this section? This is a unique opportunity to create and maintain a dialogue with one another as well as with the wider operational research community; it is my hope that this section can become a focused and effective point of reference for all of us as we embark on and expand our careers as operational research analysts.

Please contact me at [Louise.Maynard-Atem@dh.gsi.gov.uk](mailto:Louise.Maynard-Atem@dh.gsi.gov.uk)

<OR>

## REGIONAL SOCIETIES

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

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



## OR55 – IT'S NOT TOO LATE TO BOOK!

It is still not too late to register for this year's OR Society Annual Conference, OR55, which will be held near the very historical town of Exeter at the University of Exeter, Streatham Campus on 3-5 September 2013.

**TO BOOK** – go to [www.theorsociety.com/OR55](http://www.theorsociety.com/OR55) and click on **BOOK OR55 ONLINE**.

**OUR PLENARY SPEAKERS** – We are very pleased to welcome three very distinguished plenary speakers at the annual conference in Exeter this year. Please see below:-



**Jérémie Gallien**, (*London Business School*)

Jérémie Gallien is an Associate Professor in the Management Science and Operations area of the London Business School. His research focuses on pushing the frontier of supply chain management through collaborations with commercial firms including Amazon, Dell and Zara and global health organizations including the World Bank, the Clinton Health Access

Initiative and the Global Fund. Solutions developed by his research group have been implemented by several global corporations, and for this work he was inducted a laureate of the INFORMS Edelman Academy. Dr. Gallien has published, consulted and taught extensively in the areas of operations management, supply chain management, system optimization and simulation and he serves on the editorial boards of the journals *Management Science*, *Operations Research* and *Manufacturing and Service Operations Management*. He is a native of France but has been living in the United States and Great Britain since 1996. Dr. Gallien holds a PhD in Operations Research from MIT and an Engineering Degree from the École des Mines de Paris.



**Laura Haynes**, (*Head of Policy Research, Behavioural Insights Team, The Cabinet Office*)

Laura Haynes is a behavioural scientist with a passion for evidence-based policy. Since joining the Behavioural Insights Team at the Cabinet Office in January 2011, Laura has spearheaded the use of scientific evidence and the scientific method to guide and

assess the team's work on behaviour change. As Head of Policy Research, she has led the development of more than twenty low-cost randomised trials in a range of policy areas to identify cost-effective policy solutions grounded in behavioural science. Laura is lead author of 'Test, Learn, Adapt: Developing Public Policy with Randomised Controlled Trials' which is one of the Cabinet Office's most downloaded publications. Laura also heads up the team's work on health and energy/environment.



**Colin Shearer**, (*Global Executive, Advanced Analytic Solutions, UK IBM*)

Colin Shearer is Worldwide Industry Solutions Leader for SPSS predictive analytics at IBM. He has a background in Computer Science and Artificial Intelligence, and since 1984 has been involved in applying advanced software solutions to business problems.

A pioneer of data mining in the early 1990s, he was the creator and architect of the award-winning Clementine system (now IBM SPSS Modeler). Colin held various positions at SPSS including global head of Product Marketing and Senior Vice President for Market Strategy.

SPSS was acquired by IBM in October 2009, and Colin moved to his current position in January 2010.



*University of Exeter Forum, Streatham Campus*

: : OR55 : : : : : :

07

## OR55 – IT'S NOT TOO LATE TO SPONSOR OR EXHIBIT!

Every year we receive some great sponsorship for and hear from some great exhibitors for our annual conferences.

This year at OR55, at the University of Exeter, this is no exception as you will see from the list below.

If you would like to sponsor the OR55 conference or exhibit, there is still time to arrange this. For information and rates, please take a look at our website at [www.theorsociety.com/OR55](http://www.theorsociety.com/OR55) and go to the Sponsorship Information heading on the left or contact me at [hilary.wilkes@theorsociety.com](mailto:hilary.wilkes@theorsociety.com)

Our thanks go to the following contributors:-



**Dstl** is a trading fund of the Ministry of Defence (MOD), delivering trusted and often confidential advice and solutions on defence-related science and technology that impact on the security of the UK. It's demanding, exciting and rewarding work and each year Dstl recruits approximately 150 graduates to be part of it. Graduates receive a balanced programme of courses to develop technical and non-technical skills. Sponsorship is available to gain Chartered status and take further Qualifications. There are also opportunities for secondments, both in the UK and overseas. Details of Dstl's current graduate vacancies can be found on our website at [www.dstl.gov.uk/careers](http://www.dstl.gov.uk/careers)



### Making excellence and aspiration our business

We've taken just over a decade to establish the **University of Exeter Business School** as one of the UK's leading institutions. We've achieved this by striving to be the best we can be, bringing together inspirational and internationally-respected business teachers from around the world in an environment that combines historical and intellectual heritage with modern facilities.

We'll continue to invest in the very highest calibre teaching staff and facilities. We'll commit ourselves to innovative research and we'll build on our relationships with industry and society. And we're equally committed to ensuring our students leave Exeter having had a great time, with all the skills and knowledge they need to build exciting and fulfilling careers.



Resulting from a 5-year R&D project involving distinguished experts in computational optimization, **LocalSolver** is the first math

programming software combining the simplicity of use of a model-and-run solver and the power of local-search techniques for combinatorial optimization. Having declared your optimization model using mathematical operators, LocalSolver will provide you with high-quality solutions in very short running times without any tuning. Relying on local search, LocalSolver is able to scale up to 10 million binary decision variables, running on standard computers. LocalSolver is particularly suited for solving large-scale real-life combinatorial problems arising in business and industry. Such problems, with millions of variables are totally out of scope of current state-of-the-art solvers which are all based on classical tree-search techniques (integer or constraint programming). LocalSolver includes an innovative math modeling language for fast prototyping and lightweight object-oriented APIs for full integration (C++, Java, .NET). More information on a [www.localsolver.com](http://www.localsolver.com).



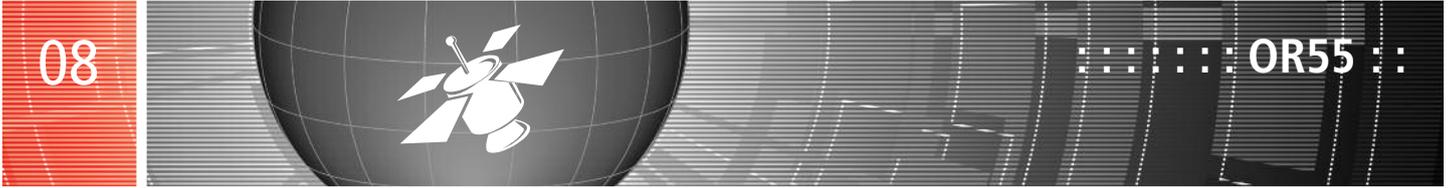
The mission of the *IMA Journal of Management Mathematics* is to publish original, high quality mathematical research that will have a significant impact on the theory and practice of business, finance, management, and policy making.

Regular articles accepted for publication in the journal must have clear implications for managers and decision makers based upon rigorous mathematical research. Such implications should be explicitly stated in the article. The journal also publishes novel meta-analyses of the literature, and developments of and comments upon studies in past articles. A manuscript accepted for publication meets at least one of the following characteristics: it contains innovative mathematics; it describes a genuine application of mathematics to a real problem; it reviews the 'state-of-the art' in a manner that provides new insight; it presents a (discrete or continuous) simulation study in a highly rigorous manner.

The journal welcomes papers that fall into relevant subject areas that include: O.R. and Management Science, Financial Modelling, Regulation, Risk Analysis, Credit Scoring, Games and Auctions, Production Processes, Logistics and Supply Chain Management, Transportation Science, Marketing Analytics, Decision Sciences, Efficiency Measurement, Health Care Management.



**Palgrave Macmillan** is proud to be the publisher of the Operational Research Society. We look forward to talking to you at the conference where we will have our complete O.R. portfolio on



display, including copies of the newest OR Society journal, Health Systems. Take advantage of the great membership offers on both the Society journals and our related titles. [www.palgrave.com](http://www.palgrave.com)



**Prospect Recruitment – Established leaders in O.R. since 1975**

Prospect Recruitment is a niche consultancy specialising in the quantitative analytical arena, with our roots in the Operational Research/Business Modelling field going back over 35 years. The combination of this market focus and our consultants’ extensive knowledge of this specialist arena, has successfully underpinned our recruitment activities, which span the full range of private sector industry and commerce.

Ranging from O.R. applications such as linear programming, optimisation, simulation and yield management; through financial modelling, forecasting and system dynamics; to customer insight, marketing, risk and pricing analytics; and statistical analysis and related decision support, we are able to offer immense depth of market knowledge and insight.

This depth of understanding and personal experience enables our consultants to provide a 1st class service to both candidates seeking the right move, and companies seeking the right hire. We ensure that optimal match is achieved, mutual expectations are maintained and the complex subtleties of the market are understood. With over 70% of our business being either repeat or via personal recommendation, we pride ourselves on being the best in our field.



JMP, from SAS, provides ‘Statistical Discovery’, exploiting the synergy between data visualisation and analysis. It dynamically links data, graphics and statistics to let you explore and model relationships quickly and easily, and then communicate your findings through a visual approach. Designed for researchers, engineers and scientists as well as statisticians, JMP is a desktop application that is visual, interactive, comprehensive and extensible. So whether you are a single contributor or part of a larger team, JMP’s unique approach allows you to make sense of your data, solve problems, and reveal new opportunities faster and more easily than ever.



The International Society for Inventory Research is a strictly professional, nonprofit organization, which endeavors to provide those engaged in inventory research with an opportunity to

exchange views and experiences on an international and interdisciplinary basis. ISIR aims to provide an appropriate and comprehensive framework for the dissemination of research results attained in the members’ country and to take an initiative in the development of research and higher education.

- In the interest of realizing its objectives, the Society
- maintains ties with those individuals and institutions, national and international organizations, who and which are active in conducting research in the same or a related area;
  - organizes meetings, tracks and conferences (the highlights are the biannual international symposia with 120-140 participants and the ISIR summer schools).
  - regularly publishes its e-Newsletter;
  - publishes results attained internationally in all related branches of knowledge.

ISIR has four main sections:

- Economics of Inventories
- Inventory Management
- Mathematical Models of Inventories
- Forecasting for Inventories

Individual membership is open to anyone engaged in research, education or practice involving the respective branches of knowledge pertaining to the focus of the Society. See more information at [www.isir.hu](http://www.isir.hu).



Banxia Software Ltd develops and sells high quality decision support (DSS) and audience response/ classroom participation systems. We provide training in the use of our software and systems and also develop add-ons for other systems. As ‘Top Interwrite PRS Partner’ we have supported many universities throughout the UK in their use of Interwrite™ Response. Our products are used in the public, private, military, not-for-profit and academic sectors. Our offerings include Interwrite™ Response, Impact Explorer™, Decision Explorer® (for cognitive/ causal mapping) and Frontier Analyst® (for DEA assessments).



**The Future of Strategic Decision Making** As institutions including the Bank of England and Federal Reserve begin to recognise the power of Agent Based Modelling and Simulation (ABMS), DSE Consulting remains one of the UK’s only commercial practitioners of this technique. DSE Consulting advises academic institutions including Nottingham University and Cranfield’s School of Decision Sciences on the application of ABMS and has forged significant advances in commercial applications for clients in the aerospace, retail and public sectors. DSE Consulting’s advanced simulations are facilitated by AnyLogic software from XJ Technologies.

## WHY TWEET – AND HOW DO YOU DO IT?

**GRAHAM SHARP**

‘Why should I be on Twitter? I don’t care what people are having for supper and they won’t be interested in what I’m doing’.

This is a common response from people who aren’t currently using the Twitter social media platform when asked about it. But what’s Twitter really about for people who work in O.R.?



Mainly, it’s a really good way to stay up to date on current events and hear about what other people are doing professionally – for example, papers, blogs, comments and opinion-pieces. Twitter can be a good way to have an interaction with your favourite commentators, it’s a good way of networking, staying abreast of the latest trends in O.R./Analytics (and all the other things you’re interested in) and following hashtags during events to see – or contribute - live comments.

It’s unlikely that ‘No one cares what you’re doing’ but, in any case, Twitter is not just about what you are doing and what others are doing. It’s about the world around you and it’s about the community you create within Twitter. It’s about the companies, universities, people, events and interests that matter to you.

In business, the conversation is no longer about what you are doing, who you are doing it with, and why it matters to you. Organisations and opinion-formers aren’t just pushing out one-way messages through print, radio and TV ads. They are now using social media to interact with people in real time.

Organisations are using social media to find out more about what people want and find interesting and are constantly searching Twitter to ensure they can respond quickly.

### How to get involved

The OR Society currently has 586 people/organisations following its Twitter feed. Here’s how to join the growing ranks:

#### Step 1

If you are completely new to Twitter, you’ll need to go to [Twitter.com](https://twitter.com) and **Sign Up and create an account**. Tip: Keep your username short – Tweets are a maximum of 140 characters so if your name is too long, people won’t mention you in re-Tweets.



You’ll need some people to follow to get started – we suggest [theorsociety](#), [informs](#), [Louise Orpin](#), [FrancesSneddon](#), [DrMilesWeaver](#). Log into your email to confirm your new Twitter account.

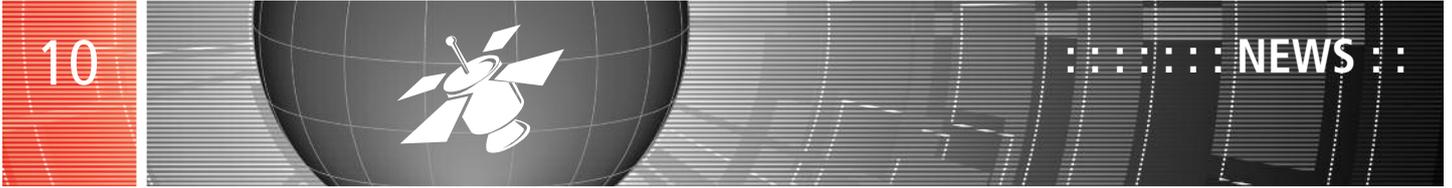
#### Step 2

Set up a brief profile – make it personal.

You need to tell the world a little bit about yourself and show them your photograph. Don’t be shy and skip this – people like to see personality on Twitter. In the BIO box add a short description about yourself.

Anyone who looks at you on Twitter will see this – it’s your ‘sales pitch’ and a big part of what makes others decide whether to follow you or not. You might want to reference the OR Society!

At [Twitter.com](https://twitter.com), from the top bar click on the cog button and select ‘EDIT PROFILE’, click ‘CHANGE PHOTO’ to add an avatar that will be displayed next to all your Tweets.



**Step 3**

Search for theorsociety to see if any of our followers are people you'd like to follow – if so click on their names and, when their profile is on screen, click on 'Follow'.



Or go to @theorsociety



**Step 4**

Choose people you want to follow (the 'who to follow' and 'find friends' functions will help). Some of those you choose to follow will follow you back and you'll have a Twitter group that will grow. You can unfollow/ block/refuse to accept as followers people whose Tweets you do not wish to read or have follow you.

What shall I write? Anything as long as it's not more than 140 characters! Join in the discussions; share details of the interesting things you're doing; link the group to articles or blogs you think they'll find interesting (shorten lengthy urls by using shortening services such as tinyurl – you have 140 characters to get your message across! Tell the world what event you're attending today and your opinion of the event.



If you see a problem suggest how O.R. could have helped solve it – share your O.R. expertise, upload a picture.

Tip! Add a #hashtag to your tweet so it will be found by people not following you. For example, adding #analytics will get your tweet found for people searching Twitter for comments on Analytics.

**Step 5**

If you see a Tweet you think those who follow you will find useful, 're-tweet' it to your followers. You can add text before quoting their tweet (if there's room!)

**Tips and tricks**

- If someone follows you, follow them back (unless they're a spammer)
- Always give credit to the original author for anything you re-tweet
- Tweet in the early evening for the biggest audience
- There are loads of 'Apps' that will let you tweet from hand-held devices
- Don't include more than two #hashtags per tweet

**Why bother?**

It's true that, depending on who you choose to follow, Twitter feeds can be populated with inane messages. However, at the other end of the spectrum, it is possible to keep yourself updated about current events and your professional life by following, for example, BBC news feeds and, of course, @theorsociety. And, since tweets are restricted to 140 characters, those who post messages have to cut to the chase!

There is another benefit to The OR Society and the profession: every time you tweet, or re-tweet about O.R. or link to an O.R. related website, Google takes note – especially if you link to respected websites. So tweets add to the likelihood of elevating O.R. and the Society in search rankings.

**Enjoy life in the Twittersphere!**





*Colosseum*



*Minerva surveys the participants of EURO XXVI*



*Team Sapienza performs on the steps of Aula Magna*

The Social programme centred on the Sapienza campus, with a welcome gathering and musical evening on the Piazzale della Minerva. Team Sapienza students acted as guardian angels steering the geographically challenged on the ground, and performed a great flash dance routine with audience participation. The last night saw a dinner in the extraordinary surroundings of the Galleria Nazionale d'Arte Moderna e Contemporanea.

Next year is the IFORS conference in Barcelona in 2014. And in 2015, EURO comes to Glasgow. Val Belton and Tim Bedford introduced the Glasgow setting, centred on the University of Strathclyde to great applause. EURO XXVI will be a hard act to follow.



*'Wow' – the venue for the Social Dinner*



## MEASURING O.R. IMPACT IN DEVELOPING COUNTRIES

MARTIN KUNC

O.R. academic communities can have an important role in social and economic development providing practitioners, academic research or consulting services to local industries and governments.

However, this role has been discussed but not measured formally in the past and there isn't a framework to evaluate its impact. This situation has hindered the possibility for O.R. academics to apply for research funds to promote social and economic development as well as to communicate the impact of O.R. more broadly to stakeholders (practitioners and governments). More specifically, the objectives of this charitable project are:

Develop a framework for measuring the role and impact of O.R. communities in social and economic development in local communities

Validate the framework with a group of O.R. communities in Latin America and disadvantaged areas in the UK

Promote the framework through presentations and workshops with relevant stakeholders, conferences and publications in academic and trade journals.

### *The framework*

I employed a framework developed in previous research (Kunc and Tiffin, 2011) based on ideas from the Triple Helix theory (Etzkowitz, 2001). This framework considers universities and different organizations as important knowledge sources in innovation systems and partners in innovation processes. This framework follows characterises the O.R. as an ecosystem (Sodhi and Tang, 2008). The main dimensions evaluated with this framework are: O.R. academic group characteristics, development of people with O.R. skills, development of knowledge in O.R., problem solving and opportunity generation activities, O.R. development activities and awareness and the impact on economic and social development.

### *Validation*

I had visited five universities in Peru and five in Colombia and I will be visiting five universities in Chile in August. In the UK, I have visited four universities with reduced O.R. groups. The finding from my visit to Peru and Colombia show that O.R. is usually embedded

in Schools of Engineering as core modules involving the traditional hard O.R. tools and additional O.R. tools (e.g., simulation and heuristics) are taught as electives in Engineering programmes. Unfortunately, there is a limited number of students following further involvement with O.R. The development of knowledge in O.R. is reduced to the application of O.R. tools to diverse issues related to production and logistics through consulting projects. While there are annual congresses in both countries, the OR societies are not as developed as The OR Society limiting the visibility of O.R. Unfortunately, the impact of O.R. in economic and social development is low.

### *Promotion*

During my visits, I had the opportunity to present the framework to a group of O.R. academics and have discussions about ideas to improve the impact of O.R. and raise awareness amount the business community. The results from the project are going to be presented in diverse conferences: EURO, OR55 and other conferences.

### **References**

Etzkowitz, Henry 2001. The second academic revolution and the rise of entrepreneurial science. IEEE Technology and Society Magazine, 20(2), 18–29.

Kunc, M. and Tiffin, S (2011) Defining and measuring the roles universities play in regional innovation systems: a comparative study of Chile and Canada focusing on natural resource based clusters. Science and Public Policy 38: 55-66

Sodhi and Tang (2008) The OR/MS Ecosystem: Strengths, Weaknesses, Opportunities and Threats. Operations Research, 56 – 267-277

<OR>

## BACK ISSUES AVAILABLE

A complete or nearly complete set of JORS and its predecessor titles going back to about 1965.

Please email Jennie Phelps on [jennie.phelps@theorsociety.com](mailto:jennie.phelps@theorsociety.com)

No charge but you would have to arrange collection/shipment from Essex.

<OR>

# British Science Festival 2013

This is organised by the British Science Association (a.k.a. the British Association for the Advancement of Science) and takes place this year in

**Newcastle, Saturday 7th to Thursday 12th September**

[www.britishecienceassociation.org/british-science-festival](http://www.britishecienceassociation.org/british-science-festival)



This year's theme is **Making Waves**.

**All Week 7–12 September** – *Slide into the Maths museum*

What is the shape of the slide that allows a body to slide the fastest from top to bottom? The UK's first museum entirely dedicated to Mathematics is also asking what you would like to see at MathsWorldUK.

**Saturday 7 September, 11:00–12:00 and 14:30–15:30**

*The Maths and Computing Magic Show*

Matt Parker and Peter McOwan (QMUL)

Magic tricks and fun with a basis in mathematics or computer science.

**Saturday 7 September 13.30–14.30**

*PrimeGrid*, Iain Bethune (EPCC, University of Edinburgh)

Join in the search for a world record prime number.

**Sunday 8 September, 10:30–12:00** – *The Randomness Show*

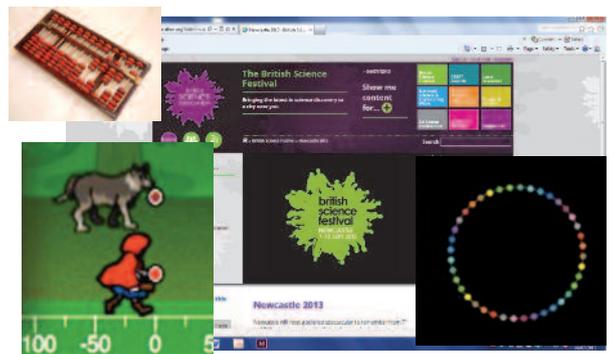
Steve Humble (Dr Maths, University of Newcastle). Numbers, patterns and mathematical magic tricks hidden in the randomness.

**Wednesday 11 September, 13:30–14:30** – *Be a Maths Millionaire*

Sara Santos (MathsBusking), Ehrhard Behrends (Freie Universität Berlin), Jorge Buescu (Universidade de Lisboa) Are equations useful? Can they make you rich? Would *you* fight over them? The secrets of Google, the rules of nature and duels over equations.

**Wednesday 11 September 16:30–17:30**

Mathematics Presidential Lecture by Celia Hoyles (Institute of Education), *Do the Maths: potential and challenges of the digital age*. Should computers be used in the teaching and learning of mathematics? *Followed by a wine reception sponsored by the Institute of Mathematics and its Applications.*



**Thursday 12 September, 10:00–12:00**

*Climate Change: Does it All Add Up?*

Chris Budd (University of Bath), Peter Cox (University of Exeter) and Vicky Pope (Met Office)

How do climate models work, are they reliable and how are they used?

Robin Johnson (Newcastle) will also be presenting *Can the Angel of the North Fly?* in the Young Persons' (Schools') Programme, Monday to Thursday.

In the City Centre: Maths Busking has trained the Street Scientists team in Newcastle to deliver maths alongside science in their street entertainment routines.



Any suggestions for the 2014 Festival (Birmingham), including proposals for Award Lecturers, to Peter Giblin, [pjgiblin@liv.ac.uk](mailto:pjgiblin@liv.ac.uk) (Chair of the Mathematical Sciences Section).

## O.R. IN THE FAMILY

SAID SALHI (ADAPTED BY JOHN CROCKER)

This is an article based very heavily on a paper 'O.R. in the family – Playing children/adult games' initially submitted to *OR Insight* by Said Salhi, Kent Business School, University of Kent.

Apologies to the mathematicians amongst you but I have tried to write this for someone with limited knowledge of mathematics.

Said's children gave him a game for Christmas comprising a board on which was drawn a six-point star and twelve counters, number 1 to 12 (see illustration). The aim of the game is to arrange the pointers so that each counter lies on the intersection of two lines with four to each line and in such a way that the sum along each line is the same. The '26' in the middle being that sum. Essentially, it is a variation on the magic square.



Figure 1. The XXVI Puzzle game (Courtesy, 2013)

The ploy was highly successful in that it gave Said's children several hours of fun as they watched Dad struggle, in vain, to find a solution. There are twelve positions and twelve counters so each position must contain one, and only one, counter and by symmetry, each counter must occupy one, and only one, position. We can therefore consider a  $12 \times 12$  matrix  $\mathbf{M}$  such that there is exactly one '1' in every row and column. If we number the rows 1-12 from top to bottom to represent the counters and the columns from 1 to 12 from left to right to represent the positions then element (1,1) is the top-left corner. If this element has value 1 then it means that counter '1' is in position '1'. For convenience, we will label the positions the same as the numbers of the counters shown. Since each value in this matrix can only be zero or one, we can treat it as a matrix of 144 binary variables. This should give you a matrix with '1's down the leading diagonal (top-left to bottom-right).

Next we have to describe the constraints that the six lines each sum to the same value (26). The six lines can be described by the six sets in no particular order as {1, 4, 7, 11}, {2, 3, 4, 5}, {5, 7, 10, 12}, {8,

9, 10, 11}, {2, 6, 9, 12} and {1, 3, 6, 8}. Note, that this is not a feasible solution because  $1+4+7+11=23$  and  $2+3+4+5=14$  which is not equal to 23 (and neither are equal to 26). In other words, at least two of the line-sums are different.

Before we do that, it might be appropriate to have a quick look at why the sum is 26. If we look at the illustration, we can see that each of the twelve points has exactly two lines passing through it. That means that each counter appears in each of two lines thus if we add up the four numbers on each of the six lines we get  $2 \times (1+2+\dots+12) = 2 \times 78 = 156$ . Now, since the sums of the four numbers on each of the six lines have to be equal, we can find what that value is by simply dividing 156 by 6 which gives 26. Alternatively, if we were to replace each of the 12 counters with 12 identical ones, each marked with 6.5 (the average value) then again we can see that each line is simply  $4 \times 6.5 = 26$ .

We now create a  $(12 \times 1)$  column vector  $\mathbf{V}$  such that  $V_{i,1} = i$ . Multiplying this vector by the matrix (i.e.  $\mathbf{MV}=\mathbf{T}$ ) we create a new  $(12 \times 1)$  column vector  $\mathbf{T1}$ . We now generate 6 sums which takes the 4 values from  $\mathbf{T}$  corresponding to the four positions on each of the six lines. Initially, these sums are {23,14,34,38,29,28}. Comparing these to 26, we can see that the first line is under by 3, the second is under by 12 and so on.

What we now have to do is swap pairs, for example, if we swap '2' with '8' and '3' with '9' our six sums are: {23, 26, 34, 26, 29, 18} giving us two lines ('2' and '4') equal to 26. If we continue in this way, there is every hope we will eventually end up with one of the 960 arrangements for which the six sums are all 26. Because of the symmetries of a six-point star, having found one solution we can very easily generate a whole host of other solutions. As far as I can tell, there are actually 20 unique solutions.

Apart from keeping his children amused, it also gave Said an excuse to test out his knowledge of O.R. skills, in particular, integer programming with binary variables. By establishing the constraints and entering these into an Excel spreadsheet, Said managed to crack it using Excel Solver, for more information contact Said Salhi at S.Salhi@kent.ac.uk. (Incidentally, one can use a similar approach to solving Su Doku.)

<sup>1</sup> To multiply a column vector by a matrix, take the first row of the matrix  $\mathbf{M}$  turn it clockwise through  $90^\circ$  and put it alongside the vector  $\mathbf{V}$ , take the product of each pair and add these up. Place this sum in the first row of vector  $\mathbf{T}$ . Now take the second row of the matrix and do the same again and so until you have use all 12 rows and have a value in each of the rows of vector  $\mathbf{T}$ . (Vector  $\mathbf{T}$  should be identical to vector  $\mathbf{V}$  initially.)



## TAKING MATHS FURTHER

**LOUISE ORPIN, EDUCATION OFFICER**

Year 10 students from four schools near Chester came together for a Taking Maths Further event at Christleton High School in June.



Following a request for one of our 'What is O.R?' DVDs a teacher from Christleton High School asked for help to support a Taking Maths Further event. The day consisted of workshops giving a flavour of mathematical topics which students would typically meet during an A level Maths or Further Maths course.

I went along with my trusted Lego to run three workshops introducing the students to Linear Programming. This is a great activity to show students the point of algebra and straight line graphs as well as being able to talk to them about the Decision Maths module available at A Level. This workshop also tied in nicely with the lunch time talk about O.R. The students would definitely know what O.R. is by the end of the day! The other workshops introduced the students to complex numbers and matrices.

Ben Follows, from HMRC in Liverpool, kindly volunteered to give a talk at lunch time about his job. Ben gave a very good talk that introduced the students to what O.R. is, and then focused on Government O.R. and a particular case study that he was involved with. Getting the students thinking about the amount of money involved when working in Government really caught their interest as did Ben's case study about cigarette smuggling. Audience participation is key to keeping interest and making the talk meaningful and Ben certainly did that. The students had to think about the different ways that items could be smuggled and then about how smugglers could be identified, Ben then told them how O.R. had helped.

"The students would definitely know what O.R. is by the end of the day!"

The feedback from the students was very positive so I have summarised some below:

### SUMMARY OF FEEDBACK FROM STUDENTS

#### One thing I have learned today

- What O.R. is
- How Maths can be used in jobs and business
- The appliance of Maths in the real world especially O.R. which I had never heard of before
- How to do linear graphs

#### One thing I really enjoyed about today

- The talk about O.R. jobs
- The talks about which jobs you can get when you do Maths
- Learning about how Maths can be used in the real world
- Learning more advanced mathematical skills
- Learning things by using Lego to show how resources are a limiting factor
- The O.R. workshop
- Decision making Maths

#### Can you imagine having a career where Mathematics may play an important part?

- I can, the day has shown more careers
- I understand maths can be a big part of many jobs
- Being an operational researcher
- I have been influenced to think Maths is very important and very variable

Giving a talk at a school or helping to run a workshop is not as scary as you might think so please get in touch if you'd like to be involved in the O.R. in Schools project, [louise.orpin@theorsociety.com](mailto:louise.orpin@theorsociety.com).



## BILL TUTTE – A FORGOTTEN HERO

JOHN CROCKER

Regular readers of this magazine will be very aware that 2012 was the centenary of the birth of Alan Turing. It also happened to be the 95th anniversary of the birth and 10th anniversary of the death of William Thomas Tutte.

Bill Tutte, as he was known, was born in Newmarket, Suffolk (best known today as the centre of horse racing in the UK). He studied chemistry and mathematics at Trinity College, Cambridge where he was the first, together with three other students, to square the square. As to whether this was what made him an ideal candidate for code-breaking it is difficult to say but, as it turned, he was yet another example of the right person in the right place at the right time.

Shortly after the outbreak of WWII, Tutte was taken on (at the recommendation of his tutor) by Government Code and Cypher School at Bletchley Park. Luckily for the Allies, Turing rejected Tutte for his Enigma team.

The first Enigma machine had been available since 1923 and, although later versions were orders of magnitude more complicated, they all used a similar method. Basically there was a plug-board which allowed letters to be swapped. On top of this, there was initially three which was subsequently increased to five cog-wheels each with 26 cogs. Each time a letter was typed in, it was transformed by the plug-board and each of the cog-wheels in such a way that the new [encrypted] letter was displayed illuminated. The sender had to first type in each letter of the message and record the corresponding encrypted letter then combine these into groups (usually of five letters) then send these groups using Morse-code. The receiver, firstly had to ensure the plug board and each of the wheels was setup exactly the same as those of the sender, then type in each letter as it arrived and record the illuminated letter finally writing these out as sentences. It was a very manual intensive operation and often involved up to three people at each end. By the time WWII broke out, a great deal of work had been done in Poland, France and the UK on finding ways of deciphering messages sent using these machines. It would still take quite some time at the start of everyday to work out the settings but, once done, messages could be decoded reasonably quickly. Messages from Enigma machines were referred to 'dolphin' until February 1942. Admiral Dönitz decided to replace the 3-wheel machines with 4-wheel versions of the u-boats – messages from these were then given the name 'shark'.

Shortly after Tutte joined GCCS, messages started coming through which were very different from 'dolphin' and were labelled 'fish'. These messages were being passed between the 'High Command'

and the Generals so it was of top-most importance to find a way of breaking the code. It was also discovered that the machines were produced by the Lorentz Company but unlike the Enigma, none fell into Allied hands until after the end of hostilities so the exact construction was completely unknown.

Although Morse-code uses a form of binary, the number of dots and dashes varies from letter to letter. With 'fish' each letter/character consisted of exactly 5 bits as it was produced by a teleprinter (using 5-hole paper tape). The machine was much easier to use as one only had to type the message in and the machine encrypted it before sending it off. The receiving machine simply reversed the process and typed out the message de-coded, provided both machines were set up in exactly the same way. Note that although five holes only give 32 combinations, this is increased to 52 by using two of the 32 as switches in much the same way as using the 'caps lock' key. Three more combinations are used for space, line feed and carriage-return and the 32<sup>nd</sup>, (no holes) is not used. (Unlike 8-hole tape, there is no parity check and punching out all holes (i.e. '11111') is not ignored, rather it is used to switch to 'alpha', in the same way that '11011' is used to 'number'.) This is known as Baudot code.

The method of encryption was invented by Gilbert Vernam in 1918 in the USA. It was deceptively simple: to each 5-bit string a random number between 0 and 31 was added bit by bit using modulo-2 arithmetic. If the corresponding bits were the same, the result was a '0' and if they were different the result was a '1'. This has the remarkable property that if you add exactly the same 'random number' to the encrypted value you get the original (deciphered) value. Also, by symmetry, if one adds the original the original (unencrypted) string to the encrypted string the result is the random number used to encrypt it. So, as long as you can generate the exact same sequence of pseudo-random numbers (on the range 0-31) encoding and decoding uses exactly the same operations. With Enigma, there were 3, 4 or 5 wheels each with 26 cogs but the Lorentz Machines had 12 wheels each with a different number of cogs (each co-prime with the other eleven). No one at Bletchley Park knew this, although they had guessed as much because each message was preceded by a 12-character string – to tell the receiver the settings for each wheel.

It is probably true to say that had it not been for a lazy operator, this





## ANALYTICS IN PRACTICE ... ANALYTICS IN RESEARCH?

**STEWART ROBINSON (PRESIDENT ELECT), LOUGHBOROUGH UNIVERSITY**



‘The large number of delegates demonstrated the clear interest that exists in analytics.’

I very much enjoyed attending the Society’s analytics event in London on 12 June ‘Developments in Analytics and Big Data – Adding Value.’

The two Johns (Ranyard and Hopes) should be congratulated on putting together an excellent event. This was the first time that I had partaken in any of the activities of the Analytics Network. Having done so, I do recommend that members engage with the network.

Apart from my role in the Society, my interest in the event lay in learning more about how analytics is playing out in the business world. My interest was certainly met. The talks demonstrated the range of applications to which analytics is being applied. The large number of delegates demonstrated the clear interest that exists in analytics. I am sure there will be a detailed report on the event in the pages of Inside O.R. either in this or a later issue, so I will not go into detail here.

In looking around the audience and talking with delegates it was very clear that the majority were practitioners; my estimate is roughly 95% of the attendees. We have clearly struck a chord with the practitioner community. Some came from the traditional O.R. base. Others might best be described as analytics professionals who had previously had little or no connection with O.R. This is encouraging for the Society as it is clearly broadening our appeal.

The event was a great success, but I was left with a question: where were the academics? I know this is a bad time of year for academics with end of year exams, marking and exam boards, but it was surprising to see so few attending. Is this a sign that we (I include myself) are not truly engaging with analytics? The evidence from the number of undergraduate and postgraduate university courses with analytics in the title would suggest this is not the case. But dig a little deeper and maybe there is not so much interest. Our own research at Loughborough ([www.whatisanalytics.co.uk](http://www.whatisanalytics.co.uk)), which is generously funded by the OR Society, has looked at publications in O.R. and Management Science journals with analytics in the title or abstract. We could only find 29 such articles in total, 11 of which were published in the practice focused journal *Interfaces*. This compares to 252 such articles that Chen et al (2012) found in the information systems literature.

Does this suggest that O.R. academics are doing very little research in analytics? Maybe, but it could mean that we are choosing to publish analytics work elsewhere, such as in the IS literature. Possibly the lack of O.R. outlets that claim to publish analytics work is not helping O.R. academics to feel confident of researching in this field. What is clear to me is that practitioners are actively interested in developing their analytics capability, including finding new ways of analysing their ‘big data’... and this requires research.

So what should the Society do to help? One possibility that seems to be regularly mentioned is for the Society to set-up a journal on analytics. As far as I know no one else has done so yet. Given the seeming paucity of O.R.-based analytics research at present, maybe there is simply not the demand for such a journal. On the other hand, the existence of a journal is likely to encourage more research in analytics. Of course, we must be wary of driving journal policy around management fads, but is analytics just a fad? I don't think big data will go away.

I would also draw the readers' attention to the academic-practitioner poster event that Jane Parkin is organising for OR55 as

part of the Making an Impact day. This will provide an opportunity for academics and practitioners to share ideas by telling each other about problems that need solutions and solutions that need problems. Do think about participating by submitting a poster. It should provide for a lively discussion.

#### Reference

Chen H, Chiang RHL and Storey VC (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly* 36: 1165-1188.

<OR>

## PRACTITIONERS SEEKING PRACTITIONERS

RUTH KAUFMAN

One of the most stimulating experiences for people working on analytical issues within organisations is meeting up with like-minded professionals working in different fields, whose problems, activities and ideas complement yours and stimulate new thinking about your own environment.

Making An Impact – the 'practitioners' stream' at the annual conference in September – is a fantastic opportunity to do just that. It is aimed at everybody whose day-job is to help make organisations more effective, whether through analytics, decision support, business analysis, management science, operational research, or just plain problem-solving common sense, whether external consultant or employee.

As in previous years, the day will include workshops of immediate relevance to practice. Participants will be able to attend two from a choice including 'technique tasters', practical application areas, and personal/professional development areas. For the first time, there will be an academic-practitioner problem-matching session. Presidents Medal case study presentations will illustrate leading practice across the whole range of O.R., whilst Colin Shearer from SPSS will be speaking from the analytics cutting edge. And there will be plenty of networking opportunities, both structured and unstructured, so you can consolidate your professional network and maximise chances of that serendipitous meeting that will transform and energeise your practice.

If you can spare longer than one day out of the office, the O.R. consultancy and case study stream on Tuesday 3 and Thursday 5 September will provide yet more opportunities for stimulating ideas, cross-fertilisation, and networking. The Keynote Paper addresses how O.R. case studies and especially the impact of O.R. can be better communicated to a wider audience, whilst case studies include topics such as aircraft ground movements, pharmaceuticals, fund allocation to industrial sectors, operational economics, and the work of the National Audit Office.

And there will be plenty of interest across the whole conference, with relevant presentations in a range of other streams, together with a series of tutorials on the Tuesday afternoon.

Follow us on Facebook or Twitter (@ORSocMAIday; #MAI55); go to the webpage (<http://www.theorsociety.com/Pages/Conferences/OR55/OR55Making.aspx>); and book your place now! (If you do not know how to Tweet, see Graham Sharp's article)

And it's not too late to get a spot in the academic-practitioner problem-matching session, or to propose a new workshop topic: please contact [ruth.kaufman@btinternet.com](mailto:ruth.kaufman@btinternet.com)

<OR>

'If you can spare longer than one day out of the office, the O.R. consultancy and case study stream on Thursday 5th will provide yet more opportunities for stimulating ideas, cross-fertilisation, and networking.'

## THE DAMBUSTERS

**JOHN CROCKER**

Many of you will be aware that 617 Squadron flew a mission on 16/17 May 1943 that destroyed the Mohne and Eder dams.

As a result, millions of gallons of water flooded the Ruhr Valley destroying factories and making a significant impact on the amount of power being generated. The dams took several months to repair and tied up some twenty thousand workers who should have been building defences on the Atlantic coast.

There have been debates about whether this raid was sensible, necessary, effective or successful. The latest of these debates is related in July issue of *Aerospace*, published by the Royal Aeronautical Society in which Dr Peter Caddick-Adams, Professor Eric Gove and James Holland express their opinions as historians.

The Mohne and Eder dams were considered to be iconic examples of Teutonic achievement. The Mohne and Sorpe dams supplied most of the power and fresh water to the Ruhr Valley industries at the heartland of Germany that had been identified as potential targets in 1937 but were recognised to be beyond the capability of any airborne weapons available at that time. The Mohne and Eder dams were concrete constructions. These were considered to be vulnerable to airborne attack. Unfortunately, the Sorpe dam was basically just a very large bank of earth and nothing short of pure brute force would breach it although it was one of the three targets that were attacked on that night.

The theory was sound but the practicalities were a major problem. The latest statistics available at the time on the accuracy of night bombing over Germany indicated that around one in three bombs fell within 5 miles of their target and for targets in the heavily defended Ruhr it was more like one in ten. For these mines to be effective they had to be within a few yards at the most. There was no way a bomb could be relied on to be dropped within a few feet from the dam. It was certainly way outside the realms of possibility to get a team of saboteurs into the area carrying sufficient high explosives.

The solution that Barnes-Wallis and his team came up with, as I am sure you will all know, was a 'bouncing bomb' code-named 'Upkeep'. The requirements were that it had to travel in a straight

line after hitting the water and bounce a number of times before coming to rest just in front of the dam then sink a certain number of feet before the pressure fuse detonated the high explosives.

This was quite a feat of engineering in its own right but it also called for incredibly high precision flying by the pilots of the Lancasters, by the navigators to get them there in the first place and by the bomb-aimer to release the bomb at precisely the right moment. The aircraft had to be at an altitude of 60 feet ( $\pm$  a few inches), at so many feet from the dam (again within a tight tolerance) and flying at 232 mph. The cylindrical bomb had to be rotating at 500 rpm to give it sufficient backspin to cause it to bounce without breaking up on impact. In addition to these factors, it was also necessary to have a fine moonlit night during late spring when the volume of water behind the dams was at its peak. And if that was not enough, they would also be under fire from the anti-aircraft gun installations guarding the dams.

The probability of a successful mission was incredibly low. Nonetheless, it was decided that the risks were worth it. Why?

There were a lot of factors in favour. It would inflict significant damage and tie up a lot of resources. It would show that the RAF's night raids as, or even more effective than the US daylight raids. It might help convince the Russians that we were still in the war. It would build on the recent success at El Alamein and hence improve morale.

Had none of the three dams been breached it is doubtful that anyone, other than those immediately involved, would have heard anything about the raid or about 617 Squadron. As to whether the raids on Peenemunde and the Tirpitz, to name but two, would have taken place, again, we can only speculate.

So from an O.R. point of view, even with hindsight, should it have gone ahead?

<OR>

### MAKE SURE YOUR CONTACT DETAILS ARE UP-TO-DATE

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 or go online to [www.theorsociety.com](http://www.theorsociety.com)  
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## NEWS OF MEMBERS

### NEW MEMBERS (AUGUST 2013)

The Society welcomes the following new members,

MORGAN O'NEIL, Surrey; PHILIP SARGENT, Cambridgeshire; ELEANOR MILL, London; ALISTAIR IRVINE, Hants; MARCELA MORALES, Colombia; THOMAS STEPHENSON, Glasgow; TORGEIR BRANDSAR, Norway;

and Reinstated members,

LAURA BOWMAN, Sheffield; DAVID COOLEY, Kent; DAVID MARSHALL, Kent; DAVID PRITCHARD, Kent;

and the following student members,

SEMCO JAHANBIN, Bath; JAMES Mc NICHOLAS, Hants; NAVEED AHMED WASSAN, Kent;

### Total Membership

2312

### NEW ACCREDITEES

The Society is pleased to announce that the Accreditation Panel has admitted the following members to the categories shown. These members are now entitled to use post-nominal letters as indicated: -

### Admit to the category of Candidate Associate (CANDORS)

Hugh AGGLETON

<OR>

## Assistant/Associate/Full Professor • Decision Analytics

### STONY BROOK UNIVERSITY

**Stony Brook University's College of Business invites applications for tenure-track faculty positions in Decision Analytics, including management science, operations research, statistics and applied mathematics, starting in Fall 2014, contingent upon budget approval. Rank is open.**

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**To apply submit a State employment application, cover letter and résumé/CV; up to two working papers (optional); up to three additional supporting documents (optional); and recommendation letters (electronic submission at <https://academicjobsonline.org/ajo/jobs/2733> is highly preferred) to:**

Decision Analytics Search Committee  
College of Business, Harriman Hall, Room 306  
Stony Brook University  
Stony Brook, NY 11794-3775  
Fax: (631) 632-9412



Stony Brook  
University

# YHORG TUCK INTO CHILDHOOD OBESITY

MICHAEL CHARLTON

Sheffield was abuzz with ideas, creativity and exciting events in June.

The pick of events for O. R. people was the Yorkshire and Humberside O. R. (YHOR) group's second meeting of the year where Alberto Franco<sup>1</sup> and Ashley Carreras<sup>2</sup> provided an informative and stimulating presentation on group causal mapping using the Group Explorer<sup>3</sup> system running along the Decision Explorer<sup>4</sup> software.

The meeting was aimed at the O.R. practitioner community and to mark the event Alberto and Ashley agreed to run a hands-on workshop.

Regular readers of *JORS*, and those with an interest in problem structuring methods, will be aware that the Group Causal Mapping method, first created by Colin Eden and Fran Ackermann, aims to build a map – sometime called a strategy map – in response to a problem situation faced by a group, usually a small team with a particular interest in strategy or in taking an action in a complicated or messy situation. Each of the participants contributes a number of ideas or activities relevant to the situation and an analytical model begins to take shape which helps to show how the group perceive the problem situation and the possible options for action.

As an example, and for this workshop, Alberto and Ashley asked participants to imagine a situation where the Department of Health wanted to look at the key issues to tackle in order to reduce childhood obesity in the region over the next five years. The participants were split into eight pairs with each pair allocated a computer linked to the facilitator's view of the Decision Explorer software.

Concepts relevant to this topic were projected on to a large screen (see figure 1). Participants could add their ideas to the model anonymously and could also see what their collaborators thought of the problem. The high productivity of the exercise was very evident, but also the complex set of different appreciations of the situation.

‘Overall the group were impressed with the speed of the process and could see the potential for its application to many areas.’

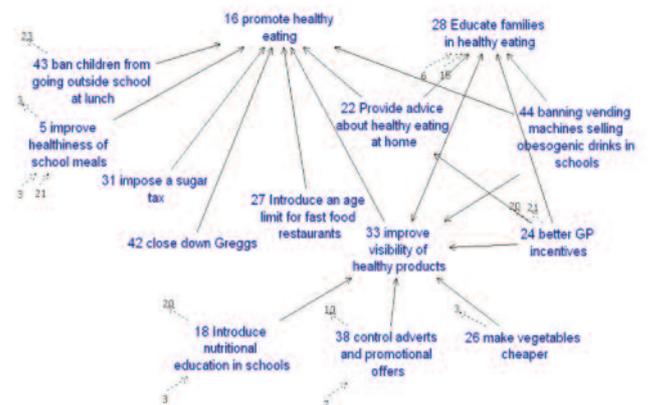
Seeing ideas appear on the screen gave re-assurance to delegates that all ideas were being captured, regardless of their value in contributing to the model.

At this point in the proceedings it was easy to be seduced by the technology and overlook the expertise of Alberto and Ashley who were working hard to tidy the model, clarify potential duplicate concepts, and ensure that concepts were written into an action oriented format. This allowed delegates to focus on idea generation and the links between ideas.

In this short workshop the ideas clustered around promoting healthy eating, and there was a strong flavour of economic incentives and legal sanctions in order to address childhood obesity.

Overall the group were impressed with the speed of the process and could see the potential for its application to many areas. After the presentation the discussion focused on whether it was best to start with a free flowing list of assertions, options, and ‘ladder up’ towards possible consequences and goals, or to begin with outcomes and ‘ladder down’ towards defining the actions necessary to produce the agreed outcomes. The lively discussions continued in Sheffield's Mercure Hotel.

Figure 1



<sup>1</sup> University of Loughborough

<sup>2</sup> De Montfort University, Leicester

<sup>3</sup> Group Explorer was developed at the University of Strathclyde

<sup>4</sup> Decision Explorer is a product of Banxia Software.



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- **Impact Explorer™** - a voting, ranking and matrix assessment tool. Groups use radio based handsets coupled with the Impact Explorer software to register their opinions or cast votes on the subject being discussed. The system supports up to 250 participants. Cost depends on the handsets being used. Prices start from as low as 31 GBP + VAT per handset. Handsets can be purchased in any quantity. Accompanying software license starts from £395 + VAT. System requires both hardware and software.
- **Interwrite™ Response** - a classroom response system. Using radio frequency or infra-red handsets, students respond to questions presented in PowerPoint, the internal question editor, or to impromptu questions asked verbally. The system can support thousands of students. Cost depends on the handsets being used. Prices start from as low as 31 GBP + VAT per handset. Accompanying software is included with the receiver kit, cost depends on the system being used. Discounts available for volume purchases of handsets.

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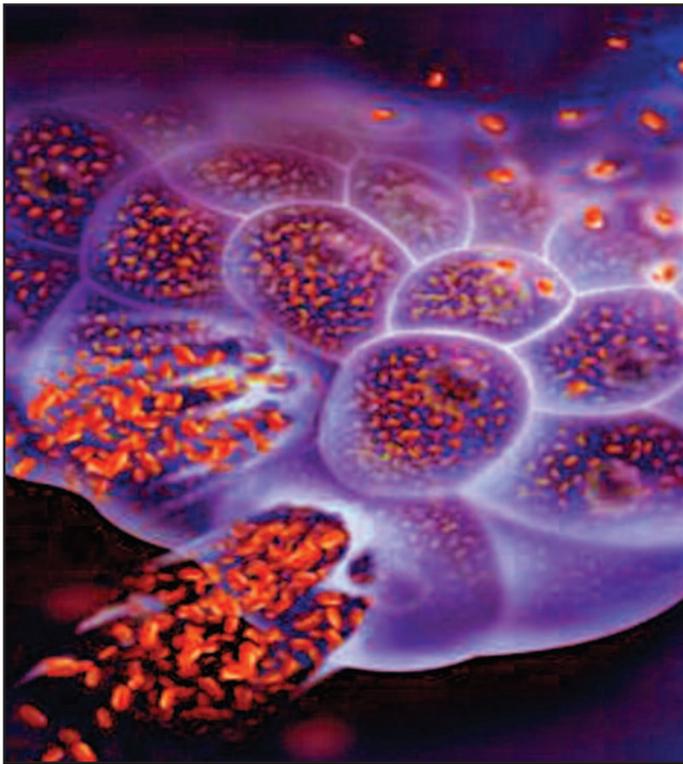
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## KILLING ME SOFTLY

**NIGEL CUMMINGS**

Mathematical modelling is being used to devise strategies to make cancer cells 'exquisitely sensitive' to virus infection in order to kill them without affecting normal, healthy cells.



*Oncolytic viruses*

According to Dr. Mads Kaern, a member of the joint University of Ottawa and Ottawa Hospital Research Institute team, 'Cancer is incredibly complicated, and what we tried to do was just to describe the basic interactions between viruses, normal cells and cancer cells. Cancer cells, for example, are distinguished by their rate of growth being faster than normal tissue.'

The project focuses on the viability and potency of oncolytic viruses: man-made viruses that target cancer cells but leave the body's healthy ones alone. The challenge is to make viruses strong enough without having them turn on the wrong tissue.

'Oncolytic viruses are special in that they specifically target cancer cells,' explains Dr. Bell, a senior scientist at the Ottawa Hospital Research Institute and professor at the University of Ottawa's Faculty of Medicine. 'Unfortunately, cancer is a very complicated and diverse disease, and some viruses work well in some circumstances and not well in others. As a result, there has been a lot of effort in trying to modify the viruses to make them safe, so

they don't target healthy tissue and yet are more efficient in eliminating cancer cells.'

The researchers have established a mathematical model that describes an infection cycle, including the way a virus replicates, spreads and activates cellular defence mechanisms. The modelling is capable of deriving knowledge about key physiological differences between normal cells and cancer cells in order to identify how modifying the genome of the virus might counter the anti-viral defences of cancer cells.

Apparently the mathematical models can predict how viral modifications would actually impact cancer cells and normal cells, and this accelerates the pace of research and allows for more rapid identification of the most promising approaches to be tested in the lab, something that is usually done through expensive and time-consuming trial and error.

The research, funded by an innovation grant from the Canadian Cancer Society, is still in its early stages, explained Dr. Kaern. 'We worked with a specific kind of cancer cell. We will now expand that to look at other cancer cell types and see to what degree the predictions we made in one special case can be generalised to others, and to identify strategies to target other types of cancer cells.' Dr. Bell added. 'This work creates a useful framework for developing similar types of mathematical models in the fight against cancer.'

Bell and Kaern's work may also help researchers better understand the interaction between these cancer cells and the virus. While one magic cure-all will likely never happen due to cancer's complexity, the researchers have developed a framework where they can learn more about the disease in the cases where the simulations do not match.

For further information, a full report on the research, 'Model-based rational design of an oncolytic virus with improved therapeutic potential' appears in the June 14, 2013 edition, in *Nature Communications*.





## ANYONE FOR TENNIS

NIGEL CUMMINGS

By the time you read this article, the dust will have settled on Wimbledon 2013, but it won't have settled on tennis modelling, the maths of which continues to be developed, hopefully in time for next year.



*Rafael Nadal's 'losing' face*

During this year's Wimbledon event, news came in that researchers from the Miguel Hernández University of Elche Tennis had successfully applied mathematical modelling techniques to rank tennis players and complement their ATP (Association of Tennis Professionals) ranking.

The original purpose of the rankings was to maximise the probabilities of the best eight players reaching the quarter finals, the best four the semi finals and the best two the finals by making sure that one and two do not meet until the finals etc. If the 64 players who start the competition were drawn at random, there is a significant chance that the top two seeds would meet long before the finals so one could end up with a match that few people would be interested in watching. This notion of seeding or ranking was first devised by Charles Dodgson (alias Lewis Carroll) who also worked out the schedule of matches. He did add a caveat that no system was perfect and there was clearly no guarantee (otherwise there would have been no point in holding the tournament).

ATP rankings reflect a tennis player's competition performance. They are based on the total tournaments and tournament rounds won over the year as a whole but the method was laborious. But researchers from the Miguel Hernández University of Elche thought there was a way of doing it better, and so they took matters into their own hands and developed an all new ranking system based on mathematical techniques and the player data provided by the ATP to see which tennis players should be ranked highest.

The results of their endeavours indicate that for this year, at any rate, Rafael Nadal has the highest score. This has earned him first place in the mathematical ranking system, followed by Djokovic,

Federer and Murray. This would ensure that Nadal would not meet any of the other three until the semi-finals when, if all went to plan, he would meet and knock-out Murray. Similarly, we would expect Djokovic to knock-out Federer in the other semi and, of course, Nadal would then play and beat Djokovic in the final.

If we look a little closer at the Elche rankings, it is interesting to note the researchers arrived at their rankings after studying gameplay from 2009 the year analysed by their study, in which Federer achieved first place on the ATP ranking; therefore it is possible to draw the conclusion from this study that, although the assessment of Nadal's and Djokovic's play came out higher than Federer's, Federer competed better as measured by the ATP system.

According to a spokesman for the research team at Elche. The ranking proposed in the study was also obtained from the players' play statistics put together by ATP, such as the percentage of points won on the first serve, break points converted, games won returning a serve, etc. With this information it was possible to deduce, in particular, who was the best player in each of these scenarios in the match. However, the ATP does not provide a ranking that reflects player performance in all aspects of play at the same time.

To obtain these placings from ATP data, the research team used Data Envelopment Analysis (DEA) and Cross-efficiency Evaluation. When players were assessed using the DEA technique, a mathematical model was used to assign each feature of play, the significance most relevant to the player, bearing in mind the particular features of his play.

Following this procedure allowed the researcher to obtain a scoring which could be interpreted as that which results from assessing the player under scrutiny with the pattern of play that was most in his favour. This 'self-evaluation' was performed for each player, such that those who received the highest scores were considered the most efficient players, while the remainder were classed as less efficient.

Thus, the researchers believed they had identified the weaknesses of the most inefficient players and compared them to the play of some of the efficient players chosen as 'referents'. This allowed them to suggest possible avenues for these players to improve their play compared with that of the other referents.

By the way, if you are interested in their work this ranked the following as the 10 most efficient tennis players by their play: Nadal, Djokovic, Federer, Murray, Verdasco, Davydenko, Gonzalez, Soderling, Roddick, and del Potro.

## NO CLAIMS, NO GAINS!

**NIGEL CUMMINGS**

Fraudulent claims do not just affect the profits of an insurance company, they also cause increases in premiums.



*Geoff Royston Analytics Seminar June 2013*

If detection rates were high, fewer people would be willing to take the risk. Gearóid Madden, Accenture, kicked-off our recent Analytics Seminar with a presentation that explained how the analysis of 'Big Data' was helping detect fraudulent claims.

To highlight how analytics could assist insurance companies thrive during these hard financial times, he presented a slide from Accenture depicting some of the findings of a survey that had taken place in 2012. The survey had revealed that one in five of the respondents were 'not having industry-leading capabilities.' The survey showed that some insurance companies had not embraced analytics fully, even though it was on their agenda for future development, especially in view of the need to maintain cost-cutting but still provide improved revenue generation.

Over the last three years fraudulent claims had increased by a massive 71%. The use of fraud modelling could reduce the costs incurred by the increase in fraud and hopefully, at the same time improve customer service and efficiencies overall. 'Customer service is key in the insurance industry'.

Detecting who is committing fraud when making claims against insurance was a difficult process and analytics could help to make it clear who was most likely to commit fraud and who was not. The business case for the use of analytics was he said 'compelling'; around 10% could be saved by analytics-aided fraud detection. For most insurers this would equate to tens of millions of pounds of savings.



*Gearóid Madden Analytics Seminar June 2013*

The equivalent of leaving your fingerprints or DNA at a crime scene is to boast to your social networking colleagues about how much you benefitted from your latest insurance claim or how you tricked the claims investigators...

Analytics could also provide significant other benefits. It could speed up the whole claims process by providing better visibility of where individual claims were in the process and by automating many activities which were currently very labour-intensive.

There are, however, two problems that Gearóid highlighted: insurance companies are notoriously conservative and; there is a severe lack of people with the right skills.

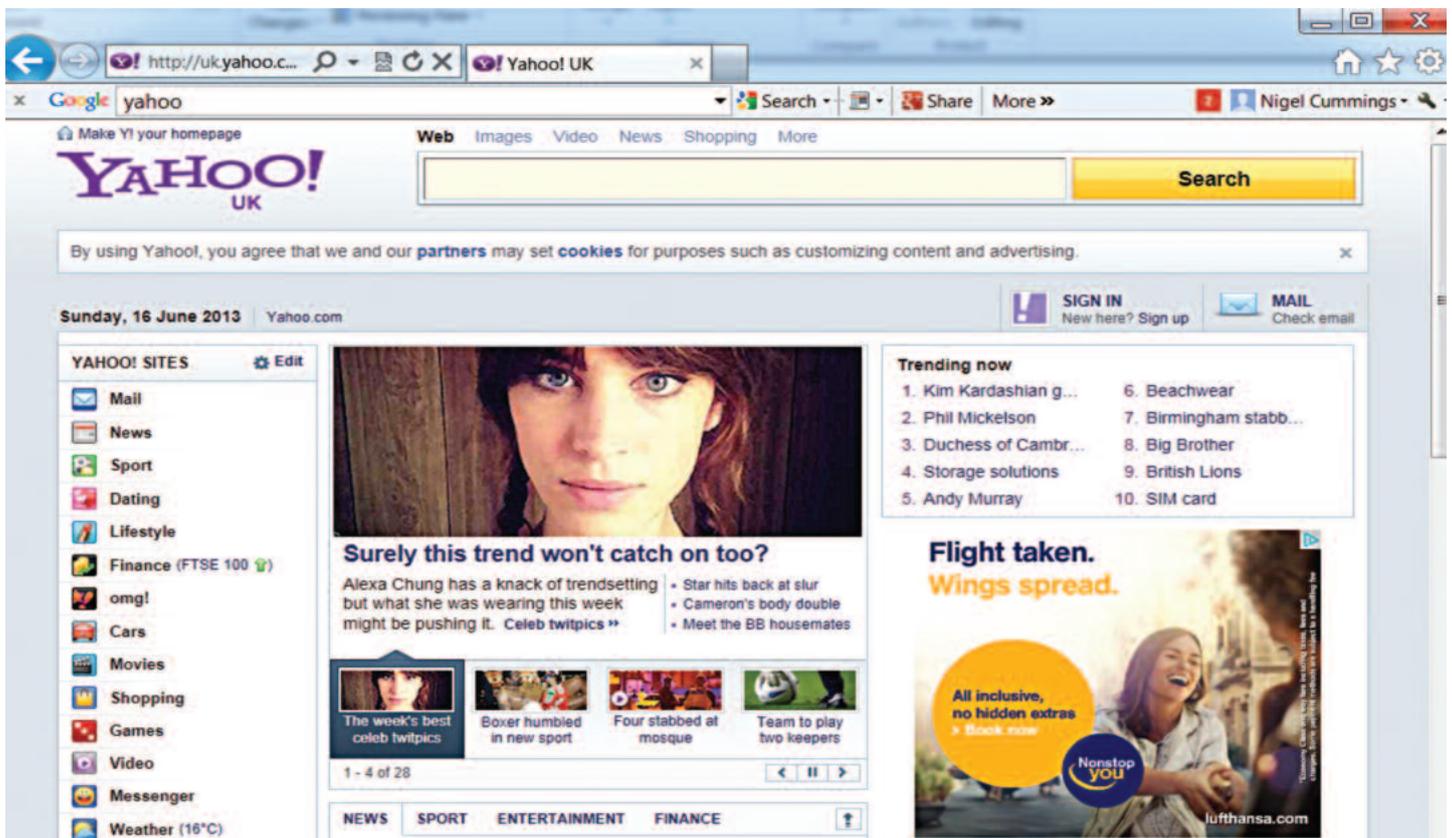
This year's seminar with the theme 'Developments in Analytics and Big Data – Adding Value' was hosted by the Institute of Engineering and Technology at Savoy Place in London. OR Society President Dr Jeff Royston chaired the morning session while Dr John Ranyard, a past president of the Society, chaired the afternoon session. There were presentations from eight key figures in the analytics industry – together they represented the many and varied areas where the use of analytics and the discovery and communication of meaningful patterns in data had proven invaluable.



## WIN FRIENDS AND INFLUENCE ADVERTISERS

NIGEL CUMMINGS

Yahoo has filed a patent that uses a measure of your social media influence to determine how much advertisers will have to pay to annoy/reach you. The higher your 'influence' the more advertisers may have to pay to target you



The patent, filed in 2011 but not published until this June, utilises software capable of calculating a user's 'social influence' from the number of contacts someone may have on their social media combined with information about products they 'like', subscriptions they make and their suggestions to other users etc. The higher it is, the higher the price advertisers will have to potentially pay to target you. The new Yahoo patent highlights segmentation of marketing at its very worst or very best depending on which way you view it – consumer or advertiser.

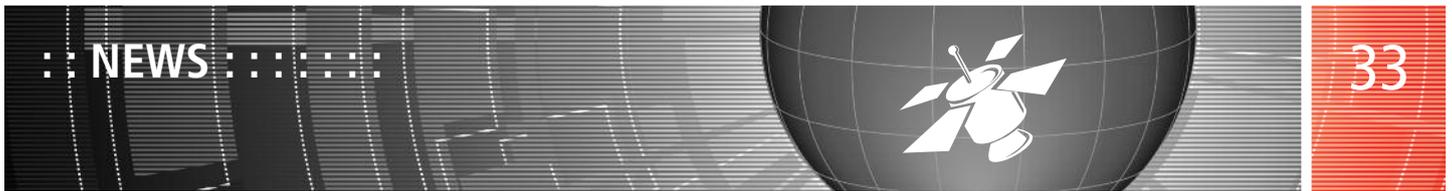
So very soon then (probably), Yahoo will be analysing all factors of your social connections to make predictions about your ability and propensity to buy products from their advertisers. Yahoo seems to think their new patent will help advertisers increase profits by choosing even the place where their ads will appear on the screen to target specific type of users and use of cookies to help in achieving their selling goals.

Industry consultants may view this as a 'creative practice' for

marketers to use a multiplier effect to influence how brands are perceived and to ideally lead to sales, but privacy campaigners may find it to be yet another way of collecting data in order to sell advertising. According to Director of Big Brother Watch, Nick Pickles, users are now viewed as products to be monitored, packaged and sold to the highest bidders and hence there is an immediate need to have stronger consumer privacy protection.

With America's National Security Agency's PRISM and user privacy being currently a hot topic, Yahoo! no doubt would prefer their patent publishing date to have been any other time but now.

The question that arises is, should I try to maximise my score and hence price myself out of the advertising market or should I try to minimise my score and hence be too cheap to be of interest to advertisers? If you want to aim for the first option, you would do very well to read Graham Sharp's article and join the birds.



# SPECIAL INTEREST GROUPS – YOUR GATEWAY TO SHARED KNOWLEDGE AND EXPERIENCE

**NOEL CORRIGAN, ERC**

The latest in the series of epistles from the Education and Research Committee addresses the Special Interest Groups: the focal points where members with a common interest in a particular O.R. area can join together and exchange ideas and experience.

Having recently taken over the role of Special Interest Group representative on the Council, I am seeking to continue the work of my predecessor Thierry Chausselet to make the SIGs more vibrant, visible and valued. In this article I will bring you up to date with what the SIGs are, what developments are in train and what you can do to help.

## What are the Special Interest Groups?

Probably most of you have attended a Special Interest Group (SIG) meeting or are on a SIG emailing list, and so are aware of their activity. The SIGs exist to further the Society's charitable objectives, so they aim to advance knowledge and interest in O.R.; and/or advance education in O.R. In other words, SIGs' activities are directed towards the practical and theoretical development of O.R. and the promotion of a wider appreciation of O.R.

The SIGs generally consist of a couple of officers (a chair and a secretary) supported by a core committee, and an extended community of individuals who all share a common interest either in a domain of application (such as defence or health) or an approach or technique (such as simulation or decision analysis). This common interest is expressed in the aims of the SIG, which can be found on their page on the OR Society website. Contacts for each group may also be found at the back of this edition of *Inside O.R.*

## What is the current status of the SIGs?

There are currently 16 SIGs (excluding the Analytics Network) of which some are more active than others. The main form of activity is get-togethers where one or more papers are presented. Most of the groups organise at least two meetings every year, and tie up with streams at the OR conference. There are also some more ambitious events such as the biennial simulation workshop.

However, whilst the majority of the SIGs are vibrant and vivid, about a third is not very active and these groups are in need of revitalising. In a similar vein, it is striking that a number of streams which appear at conference on a regular basis (transport, education) are not represented by a broader engagement through a SIG.

In addition to physical meetings, groups are increasingly using technology to achieve their aims; there is increasing use made of other social media for sharing experience and knowledge.

## What is the Society doing to help the SIGs?

The Society is striving to improve the functionality available to the SIGs on the website. Easier access to social media, blogs, and the document repository, plus easier access to update the content are all planned enhancements that will make the web more useful, much along the lines of the recently launched Analytics Network

page. Notably, the sharing of documents (within the constraints of copyright and intellectual property) is being encouraged so groups can build a formal body of knowledge via the on-line document repository.

Don't forget that the good offices of the Society staff in Birmingham can be drawn on to help organise events, and some funding is available to defray the costs of organising meetings (room hire, tea and coffee).

## What can you do to help the SIGs? Reinvigorate an existing SIG

Certain topics may reach a natural end to their relevance to the O.R. community. These SIGs need to be retired. Others may still be relevant but have fallen into a torpor; these we need to try to revitalise. As an example the SD+ SIG was founded about ten years ago in order to make better connections between the O.R. and System Dynamics communities. The SIG has been inactive for some time and we are considering whether there is still a need for it. We are currently polling the membership to judge the appetite for continuing this group. If there is insufficient interest, we will terminate the SIG. We shall repeat the exercise for a number of the other less active groups over the coming months. If you are keen to resurrect an existing SIG please get in touch.

## Start up a new SIG

If on review of the existing SIGs you decide there is not one that covers your particular interest (potentially in areas like green logistics, or energy) then the first thing to do is to call a meeting of people interested in the proposed area. OR55 will give you an excellent opportunity to get the ball rolling by identifying like-minded individuals in some of the streams. You might reinforce this by getting the society to issue an email to all members, and put an announcement in *Inside O.R.* At the meeting you need to agree on a definition of the area of interest, the aims of the proposed Special Interest Group, the officers and a committee. You will then need to propose an outline programme for the coming year. Simple.

In summary, the SIGs are thriving in some areas and providing the society with a valued and visible presence in the community, delivering benefits to the members; but as members we can do more and I am relying on you to identify where the enhancements can be made.

To misquote JFK 'ask not what your SIG can do for you, ask what you can do for your SIG'.

## JOURNALS & SPECIAL ISSUE CALL FOR PAPERS

### Call for Papers:

#### Journal of Simulation Special Issue on Simulation for Sustainable Healthcare

[http://www.palgrave-journals.com/jos/jos\\_cfp\\_sush.pdf](http://www.palgrave-journals.com/jos/jos_cfp_sush.pdf)

**Abstract:** The Journal of Simulation (JOS), an official journal of The UK Operational Research Society, aims to publish methodological and technological advances in the application of simulation modelling-related theory and practice. JOS publishes material in a wide range of domains, including manufacturing, service, defence and healthcare, as it seeks to interest and provoke discussion within the wider simulation community. JOS has recently been accepted by Thomson Reuters for indexing and inclusion in the Science Citation Index (SCI). JOS will publish a special issue on simulation for achieving sustainable development in healthcare.

The special issue editors invite contributions in conceptual, methodological and technical advances to modelling for sustainability in healthcare. Studies that have applied M&S for practical problem solving and have considered the TBL of sustainability are also welcome. The review process will be the same as that used by the journal. Topics suitable for this special issue include, but are not limited to, the following:

- Cross-domain review of literature pertaining to M&S for sustainability, with the objective of furthering sustainable healthcare simulation.
- Conceptual models and frameworks to guide the development of models for sustainable healthcare. Empirical validation of the same.
- Methodological aspects pertaining to modelling for sustainability, for example, the use of hybrid simulation models that incorporate both productivity and sustainability-related criterion.
- Studies that report on the application of simulation for sustainable dementia care, sustainable care for the elderly, among others.
- Sustainable healthcare supply chains.

- Studies that increase awareness of sustainable healthcare through use of Serious Games in a teaching environment.

### Important Dates:

Submission deadline extension: 1st September 2013  
Publish the special issue: 2014

**CALL FOR PAPERS – IJOCTA Vol.4, No.1 (Jan 2014)**  
website: <http://www.ijocta.com>. Contact: [info@ijocta.com](mailto:info@ijocta.com).

**Abstract:** An International Journal of Optimization and Control: Theories & Applications (IJOCTA) announces the call for papers for its forthcoming issue Vol. 4 No. 1 (Jan 2014). The deadline for submission of manuscripts to be considered for this issue is **August 31st 2013**. Special attention will be given to the top-rated papers presented at the **26th European Conference on Operational Research** (sponsored by EURO-INFORMS) held on July 1-4, 2013 in Rome, and **significantly improved** after the conference.

This issue welcomes submissions carried out through different disciplines in regards to optimization, control and their applications. The basic fields of this journal are linear, nonlinear, stochastic, parametric, discrete and dynamic programming; heuristic algorithms in optimization, control theory, game theory and their applications as well as managerial decisions, time minimization, profit maximizations and other related topics. Besides the original research articles expository papers, which are hard to express or model, conference proceedings, book reviews and announcements are also welcome.

### Important Dates

Deadline for full paper submission : 31 August 2013  
Feedback on paper : Sept-Oct 2013  
Publication of issue : January 2014

<OR>

## EVENTS WORLDWIDE

To see the full listing go to:

[www.theorsociety.com/Pages/NonSociety/NSEvents.aspx](http://www.theorsociety.com/Pages/NonSociety/NSEvents.aspx)



## REGIONAL SOCIETIES

### MIDLAND (MORS)

**CONTACT:** Jen East (Secretary)

**EMAIL:** MidlandsORSociety@live.co.uk

**MORS** - Just messing about with models: experiences as an O.R. practitioner

**Date/Time:** Wednesday, 09 October 2013 at 18.00

**Venue:** Aston University

**Speaker:** Jane Parkin, Independent O.R. Consultant

**Abstract:** Life as a practitioner is full of interesting questions: how do you start off negotiations with a new client? How do you get to grips with the client's business area and problem fast? How to decide on the most appropriate approach to take/model to use and how to persuade the client that your model will help to solve their problems? What do you do if the client doesn't think an analytical approach will help or even if the client doesn't realise that they have a problem? How best to manage client expectations and relationships? And finally, how best to finish off an assignment to everyone's satisfaction? These issues will be addressed via a selection of consultancy projects and there will be time for discussion on any aspect of working as an O.R. practitioner.

**MORS** - Florence Nightingale: using graphical statistical analysis to combat the spread of disease

**Date/Time:** Tuesday, 12 November 2013 at 18.00

**Venue:** The Club Room, The Old Joint Stock, 4 Temple Row West, Birmingham, B2 5NY

**Speaker:** Noel-Ann Bradshaw, University of Greenwich

**Abstract:** Florence Nightingale (from Lea, Derbyshire) is well known in mathematical and statistical circles for her graphical representations of data. But what exactly did these diagrams show and what other diagrams and statistical methods were being used at the time to analyse data? This talk will look in detail at Nightingale's graphical representation of the causes of mortality during the Crimean War. It will demonstrate how these were used by Nightingale and others to show that preventable diseases contributed to the army's high mortality rate and how the use of this data led to dramatic changes to nursing practices in Army hospitals. Non-members welcome, no charge is made. After the talks, you are welcome to join us and the speaker for a meal. For further information please contact MidlandsORSociety@live.co.uk

### SOUTH WALES (SWORDS)

**CONTACT:** Dr Jonathan Thompson.

**TEL:** 029 2087 5524 Fax: 029 2087 4199

**EMAIL:** ThompsonJMI@cardiff.ac.uk

#### SWORDS meeting

Cybersecurity: Be Prepared

**Date/Time:** Tuesday, 29 October 2013 at 17:30 Tea and coffee will be available from 5.30pm in the Internet Café which is just inside the main entrance to the Mathematics Institute.

**Venue:** Mathematics Institute, Cardiff University The talk will commence in room M/0.40.

**Speakers:** Meirion Morgan

**Abstract:** It seems that every week brings a new cyber security threat or report of a data breach at a large organisation. At the same time, the mundane reality of daily life with IT is an ever increasing list of possible threats we have to deal with at a local level. This talk will look at both and draw comparisons between them; it will also explore the quantitative implications of ever increasing computer power and algorithmic development.

#### Dr. Meirion Morgan

Meirion Morgan was born and raised in the heart of the Cynon Valley (Aberdare), and read Mathematics at the universities of Cardiff and Oxford. He has over two decades of experience in mathematically-focused IT, principally in the financial services sector, and has worked with a variety of UK and international organisations including UBS, Rabobank, London Clearing House, RBS and Lloyds Banking Group.

His career has also extended to establishing companies and includes a structured finance organisation and niche software provider to the physical asset management sector, where clients include a number of the world's major utilities. He is passionate about entrepreneurship and has given presentations to participants of the 20Twenty Leadership Program at Cardiff Met. Having started his working life in a WDA-supported technology company in Pontyclun, he is also very keen to see similar creative and digital enterprises being established in Wales.

Currently, he operates via his own consultancy, Meirion Morgan Limited, in which he is also undertaking software product development. Outside of the IT world, Meirion is a Trustee of Valeways, a small charity that focuses on the maintenance and promotion of public rights of way in the Vale of Glamorgan. He is also sings baritone and plays piano.

**For further information contact Jonathan Thompson Tel: 029-20875524**

### YORKSHIRE & HUMBERSIDE (YHORG)

**CONTACT:** Stuart Johns.

**TEL:** (0114) 225 3136

**EMAIL:** s.l.johns@shu.ac.uk

#### YHORG meeting

**Date/Time:** Wednesday, 16 October 2013 – 14.00-18.00

**Venue:** Harmer 2502 on the City Campus Sheffield Hallam University.

**Speakers:** Jane Parkin, independent O.R. consultants and Louise Orpin, The OR Society

**Title:** Introduction to Operational Research 2-3pm

**Speaker:** Louise Orpin, The OR Society



## OR-30

John Crocker  
August 1983

The August issue of *JORS* for 1983 is somewhere between a dream and my worst nightmare. Firstly, there are some 20 papers from which to choose. Secondly, they are all written by eminent members of the O.R. profession. Thirdly, there is hardly an equation in sight. Fourthly, several of the papers are reviews of the conference and the papers presented therein. One could just take the reviews and produce what one might call a 'meta-review'. Alternatively, one could read all 173 pages and write an average of 3 words per page.

Perhaps I should start by simply listing the contributors which reads rather like a 'Who's Who' and then you may get some flavour for my predicament. So, in alphabetical order: Ackoff, Russell; Beer, Stafford; Bevan, R.G; Bowen, Ken; Checkland, Peter; Douglas, A.S.; Dyson, Robert; Eden, Colin; Eilon, Sam; Godfrey, P.M.S; Graham, Robert; Hirschheim, R.M; Jensen, Arne; Lee, Alec, M; Martin, R; Müller-Merbach, Heiner; Rapley, Keith; Rivett, Patrick; Robins, Paul; Stainton, Roy and; Tomlinson, Rolfe. (Apologies to anyone who I have missed off this list.) There were only some 60 delegates, including my one time boss.

The conference, which someone irreverently referred to as the Old OR Conference was entitled, 'Systems in O.R.' and was held at Henley Management College in May 1983. As readers of this column will be very much aware, O.R. academics and practitioners have spent many happy hours debating the definition of O.R. both in terms of what we, in the O.R. community understand by it and in

how we describe it to others. In 1978, Ackoff put forward the argument that O.R. was dead and needed to be re-invented. Others have questioned the validity of referring to O.R. as a 'science' in that what we do, in practice, is frequently non-reproducible and seldom capable of validation although few would argue that it takes a scientific approach to solving problems. Maybe the fundamental problem is that 'science' is about understanding the world in which we live whereas O.R. is more about changing that world. We like to think that in doing this, we are in some way making it better and, indeed, in most cases we are but, alas, not necessarily for the world at large but rather for one small set of individuals in that world.

I have to admit that I have not read all of the papers and I am not entirely sure I have understood very much of what I have read. There are those cynics amongst us who would argue that philosophical papers are not meant to be understood for, if they were, there would little left to argue about. Although many of the more active participants in this Conference are no longer with us, I for one, doubt that if a similar event was to take place today, neither the arguments nor the conclusions would be much different from thirty years ago. Perhaps the most surprising thing is not that the debate would be the same but that we are still here to have that debate.

If you have a few hours, days, weeks to spare then I am sure most of you will find something of interest in these papers.

<OR>

## OR-20

LEADER

### What's in a name?

For as long as I have been working in O.R., there has always been a question over whether Operational Research is the right name for what we do. At times this question lies dormant; at others it has erupted into our collective consciousness.

One point is that the label 'Operational Research' fails to convey a clear image of what we do. Equally it fails to help our potential users to recognise the problems that we can help with. Another point is that no good alternative label seems to exist. Anyway, if we were to change our name we would probably confuse or lose contact with those who already know what we are and what we do. Some time ago I came to the conclusion that the best compromise was to use the abbreviation O.R. It is short. It carries as much (or as little) information as the full form without have any pretensions

of being informative. Other have taken a different view and have adopted labels like management consultancy, business analysis, etc.

The exercise to define the core message illustrates forcibly the difficulty of creating any succinct phrase which will actually do the job, although in my own view 'O.R. is the science of decision making' comes quite close.

Does the name matter? Probably not in the short term, but I am beginning to see signs of long term problems. We appear to be suffering from a loss of coherent identity.

On a somewhat trivial level we cannot know how large the O.R. community is. The number of people working within the groups labelled O.R. is very different from the number of people working in groups providing O.R. services, which is also very different from the number of people generally doing O.R. type work.

More seriously, it makes our task of presenting a coherent picture of O.R. to others even more difficult.

To give one example of this loss of coherence, the Society recently noticed that the Engineering Council and the Chartered Association of Certified Accountants had both apparently dropped O.R. from their professional syllabuses. Further investigation revealed that this is not the whole story. In both cases what had happened was that O.R. topics which had previously been grouped together and taught under an O.R. heading have now been dispersed and are being taught as an integral part of the other subject areas. This is probably good to the extent that O.R. is essentially a practical discipline and should be associated with real applications. In addition, a wider audience is likely to gain a knowledge of O.R. topics since the O.R. option was previously relatively unpopular. The downside is the loss of the label and a further erosion of the recognition by others of our identity. Perhaps this is only a continuation of the process in which successful applications of O.R.

methods are incorporated as standard methods into the repertoire of users.

I am also hearing similar stories from my university contacts. They report that other departments are removing separate O.R. options and are subsuming the O.R. topics into other course elements. They add that where this is happening, the teaching of the O.R. elements is increasingly being done by these other departments.

What's in our name? My answer is – our identity. I am not proposing that we should re-open the debate over our name but the Society needs to start developing a strategy for ensuring that O.R. gets appropriate recognition and for reinforcing a coherent sense of identity.

By Vince Hopkinson

<OR>

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**IMPORTANT:** Contributors please note. All contributions must be in four parts as follows (1) headline (approx 6 words); (2) mini-abstract (max 25 words); (3) main body of contribution (max 500 words); (4) keywords. At the editor's discretion, contributions exceeding 500 words will be shortened, serialised or published with the warning Long article. X words. Whenever possible contributions should be submitted electronically as Word files and emailed to [insideor@theorsociety.com](mailto:insideor@theorsociety.com). Illustrations should be attached as JPG, GIF, TIF or files of other common formats. Contributions submitted in hard copy must be posted to The OR Society at the address above, or sent to the Society's fax number, and be clearly marked Inside O.R. All contributions must bear the author's name and address (not necessarily for publication). All contributions accepted by the editor will be published in the print version subject to availability of space. The editor's decision on all contributions is final and no correspondence will be entered into.



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Our client, providing simulation-enabled business transformation solutions for a worldwide client base, seek an accomplished consultant with experience of dynamic simulation (ideally Witness or Simul8), optimisation and advanced spreadsheet modelling....plus fluency en Français....to take up a newly created role, either based in Paris, or the UK. This is an enviable opportunity to join a great team environment, where individual achievement is rewarded and full commitment given to training and development.

**Paris, Midlands or UK Home based**

**STATISTICAL MODELLING**  
**£30,000 - £75,000**

On the strength of continued departmental success, exciting prospects are available for graduate to experienced level analysts. Joining a dedicated pricing optimisation and modelling team, of a leading financial services group, you can expect to be developing algorithms to enable flexible customer product price optimisation using the latest cutting edge modelling technology. Those appointed will need excellent academic achievements and have a strong commercial awareness.

**North West**

**RETAIL ANALYTICS**  
**£45,000 - £55,000**

Our large online retail client has created a new role to focus solely on providing analytical insight surrounding all promotional activity. The successful individual will be able to clearly define a problem, structure data parameters and present their findings in a clear, communicative style. Ideally, you will have approximately 4+ years' commercial analytical/modelling ability, solid SQL and Excel skills and an impressive academic track record.

**West London**

**OR MANAGEMENT CONSULTANCY**  
**Package £55,000 - £65,000**

Enviable opportunity for an OR professional offering a track record of 5+ years' proven experience, to join this leading team. With projects including economic modelling, forecasting, simulation, system dynamics and optimisation, you can expect significant project variety and a stimulating, collegiate work environment. Experience could include spreadsheet modelling {preferably including VBA}, discrete event simulation or object oriented model development using tools such as VB.Net, C++ or C#.

**Central London based**

**FINANCIAL MODELLING CONSULTANCY**  
**£30,000 - £40,000**

This fast growing boutique consultancy advises clients on insightful business planning, forecasting, cash flow management, business restructuring and transaction modelling. Growth in demand is now prompting them to seek additional professionals, at either junior or consultant level, offering a proven financial modelling track record, supported by academic, technical and interpersonal excellence plus, ideally, financial qualifications such as ACA/CIMA.

**London**

**COMMERCIAL ANALYST**  
**c£25,000 + Benefits**

Excellent opportunity to join this growing and innovative transport consultancy currently seeking to recruit a highly motivated Commercial Assistant to gather and analyse KPI data from various sources. The successful candidate will be a numerate graduate (2:1 or above), ideally with an internship experience with strong analysis skills, excellent written and verbal communication ability and advanced knowledge of MS Excel. Encompassing a wide and varied brief the role offers the successful applicant exposure to a demanding and rewarding consulting environment.

**London**

**SENIOR INSIGHT ANALYST**  
**c£35,000 + Benefits**

Unrivalled opportunity to join this global brand and have a real impact on business performance and profitability by leveraging customer led insight at the heart of the business. Responsibilities encompass customer analysis and reporting, developing a suite of KPIs/metrics, campaign management, database management and external market intelligence. A numerate graduate, you should have experience; in customer analytics, database marketing, data mining through SQL and have some experience in reporting and data visualisation. Hands on experience with statistical modelling and segmentation, SQL and Excel is also essential.

**West Sussex**

**HEALTHCARE MODELLING**  
**£35,000 - £55,000**

Specialising in the healthcare sector, this organisation works in partnership enabling clients to derive optimum commercial benefits whilst also delivering excellent patient care. This brand new opportunity is based in their business modelling group and requires an impressive career track record to date encompassing: client facing modelling and data analysis; strong analytical problem solving ability; health sector experience and impressive academic achievement.

**London/UK Wide Travel**

**PRINCIPAL ANALYST-DATA SCIENTIST**  
**To £60,000 Neg DOE + Benefits**

One of the UK's leading retailers seeks to recruit a high calibre Principal Analyst/Data Scientist to work within their Customer Insight Unit. The successful candidate will have a demonstrable statistics background including forecasting and segmentation experience. You will have an intuitive grasp of numbers, be passionate about driving innovative, analytical thinking and genuinely excited about the benefits of a customer centric data driven approach can bring. SPSS or SAS required.

**Central London**

With over 30 years of specialist market knowledge, Prospect is uniquely positioned at the forefront of Operational Research and related areas.

- Forecasting & Optimisation
- Business Modelling
- Process Re-engineering
- Financial Modelling
- Credit & Risk Management
- Change Management
- Simulation
- Customer Relationship Management
- Revenue/Yield Management
- Marketing Analysis

**COMMERCIAL ANALYTICS ANALYST-OR**  
**c£28,000 - £35,000 + Benefits**

Our client's Commercial Analytics Consultants improve commercial decision making using advanced analytical techniques focused on yield management, pricing policy and optimisation of distribution. You must offer an excellent academic background, with BSc, MSc and/or PhD in Mathematics, Operational Research or a similar; either a recent graduate seeking your first analytical, problem solving role or have c1/2 year's relevant experience and be keen to further expand your quantitative analytical background.

**Bedfordshire**

**PRINCIPAL CONSULTANT-DEFENCE ANALYSIS**  
**To £55,000 Neg DOE + Benefits**

This dynamic consultancy provides analytical and management consultancy to help government and businesses make better-informed decisions. They seek to recruit high calibre Principal Consultants to work across a range of projects based on modelling and operational research techniques, and provide more general defence analysis. Working closely with clients, you will be involved in business winning and delivery activities so you must be flexible, adaptable and committed to successful delivery.

**Hampshire**

**PRICING & MODELLING EXECUTIVE**  
**Negotiable To £42,000 DOE**

Leading commercial organisation seeks to strengthen its Central Pricing Function with this new Pricing & Modelling Executive opportunity. Applicants will possess a numerate degree and demonstrate relevant modelling and business experience, preferably with some exposure to pricing or finance related analytical work. Methodical, organised, attentive to detail and results orientated are all strengths you will need to demonstrate. Strong computer skills in MS Office Suite including Excel and Access required.

**Central London**

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

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