INSIDE O.R.

MARCH 2013 NO 507

ANALYTICS NETWORK LAUNCH
BE THERE RIGHT AT THE START!
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THE PECULIAR MATHEMATICS OF DOMINO CHAIN REACTIONS

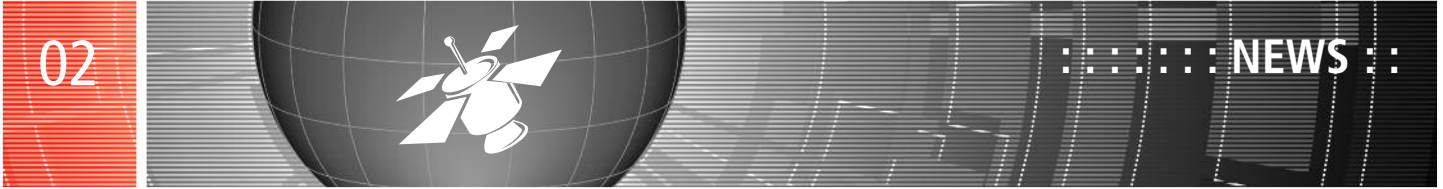## : : INSIDE THIS MONTH : : : :

A LEVELS AND GCSES - WHAT'S HAPPENING?
CAN OPTIMISING A SIMULATION BE USED TO OPTIMISE REALITY?
DRIVING FURTHER AND FASTER, IN MOTORSPORT
ANALYTICS AND HADOOP VIRTUALLY INSEPARABLE BY 2015

or

THE OR SOCIETY

www.theorsociety.com

ANALYTICS NETWORK LAUNCH
BE THERE RIGHT AT THE START!

The OR Society's newest network – the Analytics Network – will be officially launched on Wednesday 6 March at The Brewery, Chiswell Street, London, EC1Y 4SD commencing at 6.15pm.

The guest speaker is Jacqui Taylor, CEO and founder of Flying Binary

We are delighted that Jacqui has agreed to be our guest speaker on the topic of how people who work in the Analytics field can benefit from the skills of those who work in O.R. – and vice versa.

Jacqui Taylor

Want to be involved?

This being the first meeting of the new Analytics Network there will be plenty of time for a Q&A session with OR Society President Geoff Royston and Analytics Network Chair (for now!) John Hopes fielding the questions. It will also be an opportunity for anyone who's interested in shaping the future of the network to volunteer to form a committee and put a programme of meetings and events together.

There is no charge for admission to the launch event, but numbers will have to be limited, so to ensure you're there for the launch, please go to http://tinyurl.com/babbvd4 to reserve a place

<OR>

COMING SOON!
ADVANCED ANALYTICS AND BIG DATA: HOW TO ADD VALUE

12 June 2013, IET, Savoy Place, London.

Price: £150 (£75 if payment received by 1 May)

Confirmed Guest Speakers:
Gearoid Madden, Accenture, Dublin – Fraud studies
Colin Shearer, SPSS (a data mining pioneer and developer of Clementine software)
Detlef Nauck, Chief Research Scientist at BT
Fintan Galvin, i01

For more details see John Ranyard's article on page 8 and book the date now!

EDITORIAL

JOHN CROCKER

The lone Operational Researcher has always had something of a hard time.

O.R. may not be a social exercise like going to the Proms or playing football in the park but it does greatly benefit from having others around of a like mind off whom one can bounce ideas and who can offer help and advice on the best ways and tools to use when faced with new problems. Very often, the very act of trying to explain the problem to someone else is sufficient to get it clear in your own mind and lead you in the right direction to finding a solution.

As Mike Pidd said in Berlin, problems do not present with a label attached saying which method to use. Indeed, as he went on to explain, very often one may need to use several or, at least, try several, before finding the best ones. In my youth, this was referred to as the art of Operational Research that could only come from experience, but I was lucky because I had a great team around me who were happy to pass on their knowledge and experience (and, in those days, we didn't have many methods to choose from). At the time, I didn't appreciate this, which brings to mind an observation the young Winston Churchill made on returning from South Africa when he was surprised at how much his parents had learned in his short absence. I now know I am not young enough to know everything.

Following a talk by David Gilding about his experiences in the NHS in Nottinghamshire, Chris Smith has raised the question as to whether the OR Society could do more to help the lone O.R. analyst. I am not entirely convinced that we can, I have a feeling that half the problem is not knowing what question to ask. A colleague at work recently asked me if I knew the word for a word such as monosyllabic – a word which is clearly not what the word itself describes. 'Short' is a relatively short word but 'long' is even shorter so 'long' falls into this same category. It was actually more by chance than a knowledge of etymology that I discovered it is 'heterological' (the antonym of 'autological'). This is where our case studies and Science of Better websites could help, as well, of course, as our short courses.

May I be one of the first people to congratulate Stewart Robinson on becoming a FORS (to be reckoned with (groan)?) It clearly does not matter where you decide to fill out the forms, what is important is that you do so – it really is not that painful and you will feel so much better after you have done it (assuming you stand a chance of being accepted, that is)!

Did you know that we have an ERC Committee, or to be grammatically correct, an ER Committee. Brian Dangerfield, in the first of a series on what goes on behind the scenes, as it were, describes one of the activities of the Education and Research Committee.

Whilst on the subject of committees, our serialisation of the biography of Sir Henry Tizard lists some of the committees with which he was actively involved in 1942. Did you know that he was asked for advice on the design of underwear for members of the WRAF – probably the most dangerous decision he could be asked to make! The records do not indicate what advice he gave or, indeed, whether it was taken up (so to speak).

After reading Nigel's article on 'Algorithms to replace Authors', I bet you are asking yourselves whether this editorial was written by a human or a computer. Does it pass the Turing Test or the Rees-Mogg Test and, if so does that mean it was or was not written by a human?

<OR>

CONFERENCE NEWS

EVENT:		DATE:		VENUE:	
EVENT:	Analytics Network Launch	DATE:	6 March 2013	VENUE:	The Brewery, London
EVENT:	YoungOR18 Conference	DATE:	9 – 11 April 2013	VENUE:	University of Exeter
EVENT:	KIM2013 Conference	DATE:	4 – 5 June 2013	VENUE:	Forest of Arden Hotel, nr Coventry
EVENT:	Advanced Analytics + Big Data	DATE:	12 June 2013	VENUE:	IET, London
EVENT:	IMS105 2013	DATE:	3 - 4 July 2013	VENUE:	University of Salford
EVENT:	OR55 Annual Conference	DATE:	3 – 5 September 2013	VENUE:	University of Exeter
EVENT:	Blackett Lecture	DATE:	28 November 2013	VENUE:	Royal Society, London

CAREERS OPEN DAY 2013

Come and meet the future of O.R. and Analytics

This event attracts around 300 students interested in finding out about careers and postgraduate study in O.R. and analytics.

- Are you looking to recruit graduates into O.R. and analytical based roles?
- Raise your profile with undergraduate and postgraduate students interested in careers in O.R. and analytics.
- Promote O.R. and analytical Master's courses.

In addition to the Careers Exhibition, the event includes a programme of informal presentations where graduates can listen to practitioners' first hand experiences of life working in O.R. This is an ideal opportunity for exhibitors to further promote themselves with the students.

THE OPEN DAY WILL BE HELD AT THE
THINKTANK, BIRMINGHAM
ON WEDNESDAY 20 NOVEMBER 2013

This fantastic venue is located in Birmingham's city centre with great transport links and parking on site, and will provide a great setting for our Careers Open Day. We'd like to offer you the opportunity to take a stand and inspire the next generation of operational researchers.

Early Bird booking
Reserve a stand by 31 August 2013 and pay just £280 +VAT (£320 + VAT thereafter).

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

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

ENGAGEMENT CLINIC

BRENDAN HICKLING

Delivering a project in collaboration with multiple departments, agencies and clients can be daunting.
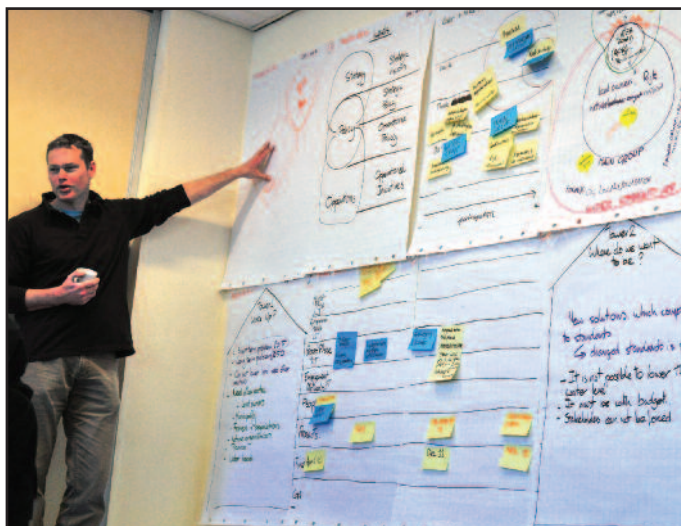
- What am I trying to achieve?

- Who should be involved?

- How can I balance the technical requirements with the political imperatives?

- How can different points of view be expressed without me losing control?

These are some of the questions typically faced by managers tasked with engaging with their wider organisation, their clients and the world outside in general. With little time and reduced budgets what is needed are some hands-on tools which quickly bring all the different strands together into a coherent strategy.

Brendan Hickling has extensive experience in helping people to navigate the sometimes very turbulent waters of stakeholder engagement. Through training in Holland, Belgium and the UK, Brendan has developed the concept of an engagement clinic where participants bring their real world projects to work on with their peers.

If you would like to know more, please contact Brendan to discuss your situation and needs, email:brendan@hickling.eu

Stakeholder Engagement

http://www.theorsociety.com/Pages/Training/Courses/3209.aspx

25-26 April 2013,

The OR Society, Birmingham

<OR>

Over two days (25 and 26 April) at the OR Society in Birmingham, Brendan will work with participants on their projects, starting with the underlying principles then progressively applying a handful of intuitive tools. By the end of the clinic, participants who have come with a project in mind can expect to leave with a fleshed-out process design, while participants who do not have a specific project will also benefit greatly by working with those who have.

'With little time and reduced budgets what is needed are some hands-on tools which quickly bring all the different strands together into a coherent strategy.'

A LEVELS AND GCSES – WHAT'S HAPPENING?

LOUISE ORPIN, EDUCATION OFFICER

Michael Gove's plans to scrap GCSEs were abandoned at the beginning of February due to opposition from the Liberal Democrats. It seems that every week the Government are announcing new reforms for the education system. Here's a summary of the reforms proposed for A Levels and GCSEs so far...

On 22 January, Michael Gove wrote to Ofqual, the independent regulator of qualifications, examinations and assessments to outline future changes to the A Level structure. The AS Level qualification is proposed to become a standalone qualification which will be as intellectually demanding as an A level, covering half of the content of a full A level and delivered over either one or two years. Alongside the standalone AS level qualification there will be a fully linear A Level which will be assessed at the end of two years. This aims to address the issues of modularity and re-sits that lead to grade inflation. Although there has been no detailed guidance on how the new A Levels will be structured it is anticipated that changes will need to be made to the applied modules which includes Decision Maths.

Mr Gove also confirmed plans for leading universities to be more closely involved in developing the content of the new A Levels, starting with those subjects which are most commonly required for undergraduate study. The Russell Group is planning to create an organisation to provide advice to Ofqual on the content of A Levels. This is an important note that the O.R. community should pay attention to, this is an opportunity for those involved with O.R. at universities to have a say in what goes into the mathematics curriculum at A Level.

The first of the new A levels will be introduced for teaching in schools from September 2015. Latest news about A Levels can be found here, www.education.gov.uk/childrenandyoungpeople/youngpeople/qandlearning/alevels.

Michael Gove had intended to replace GCSEs with the English Baccalaureate Certificate (EBacc) focusing on the core subjects of English, mathematics, science, languages, history and geography. He also planned to end competition between exam boards and have a single exam board offering a new exam in each subject.

On 7 February Mr Gove made a statement in the House of Commons outlining proposed reforms to GCSEs in which he acknowledged that his original proposal for a single exam board for each subject was a 'bridge too far' and 'one reform too many'.

Under new plans GCSEs will now be reformed instead of being replaced by the EBacc. A report by the Education Select Committee found that the EBacc could lead to a downgrading of subjects such as the arts and PE. The key proposed reforms for GCSEs are as follows:

- The new GCSEs for first teaching in 2015 will be English, maths, the sciences, history and geography.

- The exams will be linear and will test extended writing in subjects such as English and history, have fewer 'bite-sized' and overly structured questions, and in mathematics and science there will be a greater emphasis on quantitative problem-solving.

- Reformed GCSEs will no longer set an 'artificial cap' on how much pupils can achieve by forcing students to choose between higher and foundation tiers so reformed GCSEs will allow students to access any grade.

Michael Gove's' full statement can be found here, http://www.education.gov.uk/inthenews/inthenews/a00221416/curriculum%2c-exam-and-accountability-reform

<OR>

EDUCATION & RESEARCH COMMITTEE: ROLES AND RESPONSIBILITIES

BRIAN DANGERFIELD (LIAISON WITH ESRC), SALFORD UNIVERSITY

In the spirit of keeping the membership informed about the governance of the Society, the members of the Education & Research Committee have committed to writing short monthly articles covering various examples of what we do. This is the first and I have chosen to explain our relations with the *Economic & Social Research Council* (ESRC).

Brian Dangerfield

Whilst monitoring and liaising with the *Engineering & Physical Sciences Research Council* (EPSRC) might be thought to be more appropriate for O.R. (and my colleague Tim Bedford will write about that in a subsequent issue) consider two important facts:

firstly, it is ESRC which is home to research in Business & Management Studies and Economics and secondly; over the past 25 years or so, the subject-matter of O.R. has been extended to include what is often termed *Soft O.R. (sort of more oo aah, so to speak)*. In short the toolkit of an operational researcher has been extended beyond classical optimisation techniques and heavily mathematical approaches to embrace methods which address more complex problematiques involving multiple stakeholders, replete with human and social influences and the need to deal with interaction effects. Moreover, it has been UK researchers who have figured predominantly in the vanguard of those making this transition in the O.R. landscape.

Given the above context I am currently engaged in a dialogue with ESRC with respect to the recently-launched site for a *National Centre for Research Methods* (http://www.ncrm.ac.uk/) which underpins the type of advanced training to which post-graduate researchers (PGR) in the social sciences can expect to be exposed. In 2012 there was apparently a poor response to a national survey which endeavoured to determine the range of advanced training which might be made available to a PGR and whether any additional provision should be commissioned. Both the above

website and typical texts on research methods in the social sciences cover standard approaches which are usually confined to statistical/data analysis techniques, questionnaire design & analysis and econometrics.

The view of the ERC is that there is a lack of pluralism in social science research methodologies. O.R. is the home to a number of the newer methodologies, for instance: systems thinking; cognitive mapping; system dynamics; soft systems methodology; strategic choice approach; discrete-event simulation. These are not heavily mathematical (and thus appropriate for EPSRC doctoral students only) but are of an analytical nature and surely need to be on the awareness list of business, management and economics research students, at the very least. Even sociologists might find some of this diverse array of tools to be methodologically acceptable (sometimes superior) when judged against existing and conventional approaches. There is evidence from the publishing world that traditional social science research methods are too restrictive: see the Call from Routledge for chapters for their forthcoming Handbook of Applied Systems Science. (http://www.msu.edu/~zpneal/handbook_cfp.pdf)

Another ESRC initiative concerns the impact of research. Anyone contemplating the forthcoming Research Excellence Framework (REF) exercise will know that impact carries a considerable weight (20%) in the overall assessment of each academic unit. To this end, the ESRC are celebrating impact by inaugurating an annual Impact Prize relating to five different forms of impact together with an overall *Impact Champion*. Winners receive £10,000. To submit an application you need to have some funding connection with the ESRC, either current or in the recent past. Unfortunately, by the time you read this, the deadline for 2013 submissions will have passed but members may wish to look out for next year's competition. In addition the categories for the prize could perhaps offer some clues for those charged with writing their impact narrative for the REF.

<OR>

NEWS

DEVELOPMENTS IN ADVANCED ANALYTICS 2013 ADDING VALUE WITH O.R.

JOHN RANYARD, ANALYTICS WORKING PARTY

Now 12 June at the Institution of Engineering and Technology, Savoy Place, London WC2

Following last year's very popular and well-attended event, we are this year again running a one day meeting on Advanced Analytics, so as to update our members on current developments as well as demonstrating to the wider Analytics community how O.R. can add value in this rapidly growing field, commonly labelled 'Big Data'.

This year's meeting will follow a similar format to last year's, with six or seven speakers, including our President, Geoff Royston, who is giving strong support to the Analytics Initiative, and John Hopes, who chairs the Analytics Working Group. They will be building on the launch of the OR Society Analytics Network (covered elsewhere in this issue) by explaining how O.R. can add value to Analytics and how the OR Society can provide support to analytics practitioners.

I am delighted to announce that we have already lined up some high profile speakers for this year's event:

- Colin Shearer, Global Executive, Advanced Analytical Solutions, IBM (SPSS) on leveraging the power of Advanced Analytics. Colin will be known to many as the creator and architect of the award-winning Clementine system (now IBM SPSS Modeler) and a pioneer of data mining

- Detlef Nauck, Chief Research Scientist at BT, is BT's leading expert in data analytics and Big Data. He will be speaking about the impact analytics is having on his (very large telecoms) organisation, as well as exciting new research developments.

- Gearóid Madden, Senior Manager, Accenture Analytics, will speak on the use of Analytics in Fraud Detection in the Insurance Sector. The Accenture Analytics Innovation Centre in Dublin, is a showcase for Accenture's predictive analytics capabilities

Remaining speakers will be confirmed shortly.

Once again this event will be subsidised by the OR Society to ensure excellent value once more **so put it in your diary now and mention it to your Analytics colleagues**. A mail-shot with the final details, including registration, will be available in time for next month's issue.

Colin Shearer is Global Executive, Advanced Analytic Solutions 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 2012.

<OR>

INVITATION TO BID TO PROVIDE OR SOCIETY TRAINING COURSES IN 2014

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

The OR Society's Training Working Group invites bids to provide training courses in 2014. All offers of courses will be considered, though there is no guarantee of acceptance.

For 2014, courses in the following areas are particularly encouraged:

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

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

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

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

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

Bids must be submitted on forms obtainable from and returnable to:-
Jennie Phelps at The OR Society, 12 Edward Street, Birmingham B1 2RX. Tel 0121 234 7818. Fax 0121 233 0321.
Email jennie.phelps@theorsociety.com

Closing date for the receipt of bids is **26 April 2013**. Bidders will be notified of the outcome at the beginning of July.

<OR>

DON'T MISS OUT ON YOUNGOR 18!

DR. ANTUELA TAKO (CHAIR)

Your last chance to sign up is approaching fast!

Peter Chalk Centre, Exeter University

YoungOR18 runs from 9-11 April 2013 in Exeter. The deadline to sign up is almost upon us with all abstracts to be submitted by 28 February 2013 and final registrations to be made by 10 March 2013. To make sure you don't miss out on this excellent conference, reserve your place now at www.theorsociety.com/yor18.

Can't afford to come to the whole conference?
Have you thought about attending for one day? This reduces both the cost and the time out of the office and you can pick a day that covers the topics most relevant to you. Visit our website during early March to see more comprehensive details.

Here's what you can expect
Young OR conferences are packed with three days of work, fun and getting to know other O.R. people. The highlights include:

THE WORK PART
* **Developing your O.R. tool kit**; improve your knowledge about where O.R. techniques are applied through application specific **stream presentations** and learn the theory behind and practicalities around applying O.R. techniques through **training sessions**.

* **Keynotes highlighting success stories and new ideas put into practice**; confirmed for analytics, data envelopment analysis, disaster management, optimisation, health, soft methods, strategy and sustainability, and supply chain.

* **Plenary sessions**
* **Presidential address from Dr. Geoff Royston** (President of the OR Society and former Head of Strategic Analysis and Operational Research in the Department of Health for England and former Chair of the Government Operational Research Service).

The Presidential address will look at threats and opportunities for O.R. over the next decade, highlighting key growth points. It will set out some alternative futures for O.R., inviting the audience to consider the merits of each. Finally it will discuss how those in the earlier stages of their career, whether working as practitioners or as academics, can make a major impact on future developments and so help realise a vision of O.R. as vibrant, visible and valued.

* **'Continuous Improvement: Past, Present and Systemic Future' from Dr. Amanda Gregory** (Director of Learning and Teaching in the Business School, University of Hull).

Continuous Improvement is the propensity of an organisation to constantly pursue enhancements in its processes, products, and services for the benefit of all its stakeholders. The historical roots of Continuous Improvement can be traced back to Deming's work which was fundamentally embedded in the Lean Manufacturing effort and the notion of 'kaizen'. More recently, the concept has found expression through the Lean Systems Thinking approach which has been widely embraced by the public sector in the UK. This presentation will not only provide an overview of the past and present of Continuous Improvement, it will look beyond these towards a future in which Continuous Improvement is underpinned by systems theory and practice. To develop such an underpinning might serve to make Continuous Improvement unexceptional: an integral part of simply 'how things are done'.

* **'Using data to drive action for customers' from Elizabeth Shepherd** (hotels.com).

This talk will focus on how hotels.com are using test results to drive changes to the site and also how reporting is taken to the next level as a directed set of actions.

* **Careers' panel**; hear from leading O.R. practitioners from both the public and private sector, academics and recruitment consultants and have the opportunity to ask questions that concern you about your career in O.R.

* **Prizes;** presenters will have the opportunity to compete for the chance to win the prestigious Elsie Cropper award which is given for the best paper presented at the conference.

THE FUN PART
* **How to get O.R. into the Mathematics Classroom workshop**
An interactive workshop with the aim of generating ideas for case studies and resources that can be developed to further the O.R. in Schools project. Cardiff University and the University of Greenwich are developing an O.R. Ambassadors in Schools scheme that links O.R. undergraduates with local schools to run O.R. activities with the students. Feedback from a previous Ambassador's experience will be provided to set the scene for this workshop. Please bring your ideas and examples of great O.R. work you have done or been part of.

* **Outside O.R. workshop**
This workshop will focus on and encourage people to think about how they can use their O.R. skills and knowledge outside of their 'day-job'.

* **Social Networking Events**
While the days will provide plenty of mental stimulation, the evening socials will afford ample opportunities to wind down and to make acquaintances in a more relaxed environment. Starting

Holland Hall balcony

from Monday evening after dinner, there will be an opportunity for delegates to meet members of the committee at the bar, where there will be the opportunity to play table games or horse racing.

On Tuesday after dinner, there will be an invigorating **pub quiz** to take you through the evening. On Wednesday night there will be a stylish Gala Dinner, followed by a disco and casino games in the Holland Hall Building. Earlier parts of the Tuesday and Wednesday evenings will be available for those who wish to check out some of Exeter's attractions, such as the Gothic St Peter's Cathedral and the Roman City Wall, its vibrant quayside or underground passages beneath the streets.

Accommodation is located in Holland Hall. This facility, known

locally as Holland 'Holiday Inn' Hall is named after Sir Geoffrey Holland, the Vice-Chancellor of the University who retired in 2002. It opened in September 2004, has been awarded a 4-star Visit England Campus Accommodation accreditation and has stunning views across the Exe Valley.

Book now!
Final registrations need to be made by 10 March 2013, so please book now! Reserve your place online now at www.theorsociety.com/yor18.

Thank you
The committee and the OR Society are most grateful to Dstl who are sponsoring the conference handbook.

dstl

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. Details of **Dstl's** current graduate vacancies can be found on our website at www.dstl.gov.uk/careers

The committee looks forward to welcoming you to Exeter!

<OR>

Want to book a stand in the YoungOR exhibition?
For details please contact Kuangyi Liu, PriceWaterhouseCoopers, on kuangyi.liu@uk.pwc.com
or Hilary Wilkes at The OR Society hilary.wilkes@theorsociety.com / 0121 233 9300

ELSIE CROPPER SHIELD FOR BEST PAPER AT YOUNGOR 18 CONFERENCE, 9-11 APRIL, 2013

J. C. RANYARD

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

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

All presenters at YoungOR 18 are eligible, except for Plenary Speakers, those giving tutorials or workshops and those who would not normally be eligible to attend the YoungOR conference.

All YoungOR 18 delegates are invited to rate the presentations that they attend, using a pro forma which is available at each session. The session chair will collect the voting papers at the end of each session and pass them on to the committee. The Organising Chair will appoint two judges, one of whom will be a member of the organising committee. The judges will scrutinise the voting papers and decide on the winner.

The following criteria will be used as guidelines:
1. Impact of the work – both quantitative and qualitative. For example, does the work have current/potential demonstrable benefits; has it resulted in a better understanding of the problem area or improved management practices?
2. Technical Content – for example, appropriate choice of techniques/methodologies.
3. Quality of presentation – for example, logical structure, clear slides etc.

The winner will have his or her name inscribed on the Elsie Cropper Shield and will be invited to attend the Blackett Lecture on 28 November 2013 at which the shield will be formally presented. The winner will also receive a commemorative plaque. The winner of the Shield will be announced on the last day of the conference after all eligible talks have been presented.

<OR>

YOUNGOR 18 CONFERENCE: 9-11 APRIL 2013

SAYARA BEG STREAM ORGANISER

Big Data, Data Scientist, Advanced Analytics. These are the buzz words for today, often coined as sexy and described as the next frontier.

Yet the questions remains, what is it. At YoungOR 18, the analytics stream aims to explore that question, from keynote speaker to various presenters from industry, government and academia.

Analysis first began in guise of Decision Support Systems (DSS) implemented in the mid 1960's, moved towards Executive Information Systems (EIS) evolving into Management Information Systems (MIS), Business Intelligence (BI) and Data Warehousing (DW). These advancements were supported by academically researched best practices which subsequently became robust industry standards such as Codd & Date's Relational Model and OLAP (On-Line Analytical Processing) designed databases driving improved computational performance of Management Information Systems leading to many vendors to introduce desktop based Business Intelligence software such as Business Objects and Cognos, to replace the basic spreadsheet modelling techniques.

Sayara Beg

Then as the need to analyse more data grew wider, the various organisations acknowledged to move away from limiting but quick deployments of desktop MIS or BI applications started to move towards a more process intensive server based analysis and this was supported by Ralph Kimball's Dimensional Modelling with terminology such as Star Schema or Snowflake Schema database designs, often known for the 'top down approach' complimented with Bill Inmon's Operational Data Store (ODS) database design creating what is now the industry accepted definition of what a data warehouse is - a subject oriented, non-volatile, integrated, time variant collection of data in support of management's decisions.

My very first job, after graduating from an O.R. based bachelors degree called Decision Sciences from University of Hertfordshire, was as a Merchandiser for the men's casual wear department in Debenhams' Head Office off Oxford Street, in London, which was then part of Burton Group. It was my ideal job. It involved fashion and it meant that I could the latest designs at a fraction of the high street cost, through sample sales, attend model shoots and catwalk shows, mingle and name drop the fashion connoisseurs associated with high street fashion brands and magazines. Think 'The Devil Wears Prada' at a lower end of the fashion scale.

As a merchandiser, my job was to review previous weeks' actual sales figures from every Debenhams store around country against the forecasted sales figures for that week and assess performance of actual against forecast and explain the differences. These could arise because of seasonal factors, location or geographical factors, local event factors and so on. Based on these factors, I would then adjust the forecast for the following week. The sales figures would break out into style of clothing, size and colour and back then the biggest seller on our books was men's green corduroy trousers at size 38.

The tool that helped me with my forecast adjustments was a decision support system that ran 'what-if' scenarios for each combination of factors I would type in and once typed in, would run impact assessments to large distribution warehouses, in-store warehouses, supplier stock ordering routines, external suppliers and internal distribution delivery schedules, should the forecast figures challenge the tolerance levels for each of these areas. Too much change in the forecast, either way, could break the whole system. And I had to assess if the stresses against the whole system, was worth profits achieved from the revised forecast in the increase in sales. This process alone, would take me most of the week and then I would have to do it again, the following week.

What I learnt the most was how much manual effort was required to gather the data to enter in the DSS, before any modelling could even begin, which meant more time was spent identifying, collecting, capturing data, than actually analysing the results.

But this is all set to change. With many various Big Data technologies entering the market today, there is the incentivisation that less time will required by Analysts to manually identify, collect, capture data, because the Big Data technology will do that for you, and more time can be spent analysing the results so that the analysis itself becomes more advanced. Advanced as a result of improved data visualisation, computational identification of trends and network, automatic simulations or what-if scenarios in split seconds, with a computer's interpretation of results. Is this the beginning of Artificial Intelligence?

Without a doubt, the future of Analytics is changing. At the YoungOR 18 conference, the analytics stream keynote speaker, representing one of the many Big Data technology companies in the market, TIBCO Spotfire, and will discuss why the redefined Analyst being a Data Scientist is sexy in the era of Big Data. You will hear how Data Scientists are of increasing importance in the era of Big Data and should be organised into a productive unit that can address the differing requirements of data analysis across a business. In particular you will learn from their experiences, through case studies, in financial services organisations.

Do not miss out on this exciting, leading edge concept that is on the cusp of becoming the new best practice and subsequently the industry standard in the world of analytics, attend the YoungOR 18 conference at the University of Exeter in April 2013 to learn more about it at and be part of the change.

<OR>

SIMULATING IS MORE THAN USING SIMULATION SOFTWARE

STEWART ROBINSON, LOUGHBOROUGH UNIVERSITY

There is a lot more to developing and using simulation models than just learning to use a simulation package.

The modeller needs to be able to understand the key features of the system, determine which parts of the system to model and how, collect and analyse the data needed for the model, verify and validate the model, perform experiments and obtain accurate estimates of performance, and run and compare alternative scenarios in order to improve the system.

The course 'Simulation: A Practical Guide to Developing and Using Models' aims to develop these vital skills. This three day course assumes that you will develop your knowledge of a simulation package elsewhere. Our focus is on how you will use that package to work on real problems. In doing so the course covers the following topics:

- Why use discrete-event simulation?
- Understanding how discrete-event simulation software works
- The simulation modelling process
- Conceptual modelling: designing the model
- Issues in data collection and analysis
- Verification and validation of simulation models
- Experimentation: obtaining accurate results from a single scenario
- Experimentation: running and comparing multiple scenarios
- Successful implementation

Supported by examples and cases, you will have opportunity to develop practical skills in all of these areas during the course. You will also receive a copy of the book 'Simulation: The Practice of Model Development and Use' (by Stewart Robinson).

If you are serious about simulation, then this is the course for you.

Simulation: A Practical Guide to Developing and Using Models is running from 19-21 March at the OR Society's office in Birmingham.

The course tutor, Stewart Robinson, is Professor of Management Science and Associate Dean for Research at Loughborough University, School of Business and Economics. He has performed simulation consultancy projects over a period of more than 25 years. He is author/co-author of five books on simulation. His research focuses on the practice of simulation model development and use. Key areas of interest are conceptual modelling, model validation, output analysis and alternative simulation methods (discrete-event, system dynamics and agent based). Stewart is co-founder of the Journal of Simulation and the OR Society Simulation Workshop. He is President Elect of the Society.

<OR>

To book on this course or for more information please contact Jennie Phelps on 0121 234 7818 or jennie.phelps@theorsocirty.com

WHERE ARE THEY NOW?

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

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

Tarifa Almulhim	Manchester	David Elliott	Herts
Telesilla Kotsi	Germany	Gowtham Bharatwaj Srinivasan	Kent

<OR>

ALGORITHMS TO REPLACE AUTHORS, WELL NOT REALLY!

NIGEL CUMMINGS

Sophisticated programming mimicking the thought process behind formulaic writing may replace authors in the not too distant future.

An economist called Phil Parker has authored more than 1 million titles, mostly non-fiction. He has achieved this remarkable record by utilising a collection of highly sophisticated algorithms that are capable of writing a whole book from start to finish in as little as a few minutes.

Parker is the CEO of ICON Group International Inc, a company that has been responsible for writing hundreds of thousands of titles. Some of them are very specific topics, but some of them are on more abstract ones like poetry and verse. In Parker's case, his eureka moment came in the early 1990s, during a time when he was working on reports where a feature was intense economic analysis. It was while doing this economic analysis and generating reports necessary to convey the meaning of it to others, he realised that most of what economists do is extremely formulaic in nature.

He realised that a lot of the so-called 'creative component' of the report writing process could be reverse engineered and basically characterised by algorithms and be used in an automated fashion. The methodologies are extremely old, just like the methodologies of writing haiku poetry or Elizabethan sonnets, for example. A sonnet comprises 14 lines of iambic pentameter with the first 12 lines rhyming alternately and the last two forming a rhyming couplet. Shakespeare is credited with having written 154 sonnets which were first published in 1609. All genres including horror, sci-fi, adventure, romance, mystery are little more than a form of constrained writing.

Every book that is written has some constraints imposed upon it, there are constraints on its length based on page formats and font sizes and the expectations of its readers. There are also natural constraints that exist in all forms of writing. In the non-fiction area, the constraints are fairly well understood by the people in that area.

Parker has an excellent analogy regarding his thoughts about constraints in books and in everyday life. He says, 'Small businesses doing import-export business do it for very narrowly defined products. They don't do it for general products. That's why for Amazon and elsewhere, all these titles are created in very arcane categories, and that's because that's what people actually do business in. Nobody does business in hardware parts; they do it in 6-inch copper screws. So for those businesses, to hire a consultant firm to say 'Hey, can you give me a worldwide estimate of copper screws,' the firm would go out and spend a month or two basically doing the job an economist and a couple of researchers do. Those people then pass off the editorial analysis to a group of people who do formatting and copy editing and graphic design, who then pass it off to another group of people who do metadata, covers, spines, all that. All we did is reverse engineer that. But the methodology to do that already existed before the books existed.'

He is reverse engineering, he has not however created any new way of writing, what it has done is to create computer programs that mimic the way people write. If you do an analysis of sonnets, only about 10% of sonnets violate the rules. But they do it only in a very particular way. Even that formulation of violation is itself constrained... Once you have all of those rules you then write algorithms that mimic those rules.

Parker's company created a system which mimics the human mind. In reality, the human mind is formulaic and thus reproducible. If you step back far enough, all of literature is highly formulaic and reproducible too, not just economic reports and romance novels. Some of the genres are so formulaic that the publishers of those genres tell the potential writers how to write the books themselves.

Part of the problem that his company looked at was defining how a genre could be defined by formula. His company found that across genres, often you find the same formulas taking place in little twists, which throw them squarely in a different genre. But the twist is minute. A romance book can become a thriller by rearranging certain components of it. In essence, formulas of genres have patterns in them which overlap with each other. The way of visualising this could be to think of a Venn diagram, and the intersection between components within the diagram. The more genres intersect with each other, the more likely that recurring patterns can be observed.

:: NEWS :: :: :: ::

The company started its quest for auto-writing perfection by using this graph theoretic approach to write dictionary definitions. ICON turned its writing algorithms on generating dictionaries, using cluster analysis and graph theory combined. The system algorithmically mimicked what a lexicographer would do if they had access to such a large data base. The process involved first creating a linguistic graph that defined language and then all of the relationships between words and the phonetics behind the language.

Narrative Science's **Quill**, which dates back to 1983, can transform automatically structured data into plain English stories which are supposedly indistinguishable from those generated by humans, and at an unprecedented speed and scale. Quill is a synthesis of data analytics, artificial intelligence and editorial expertise which provides its operatives with an ability to describe, predict and advise based purely on data, Quill software has artificial intelligence in the form of a 'natural language engine' built into it.

Instant Article Wizard, more commonly referred to as IAW, was written by Jonathon Leger an expert on the field of automatic writing systems. IAW is considered as a content writing tool which assists its users in writing 'quality content' whilst radically decreasing the time needed to collect the info and accumulate it in a simple and very efficient manner. It is an extremely clever program which produces content quickly and easily.

Article Builder is another Jonathan Leger product that is one of
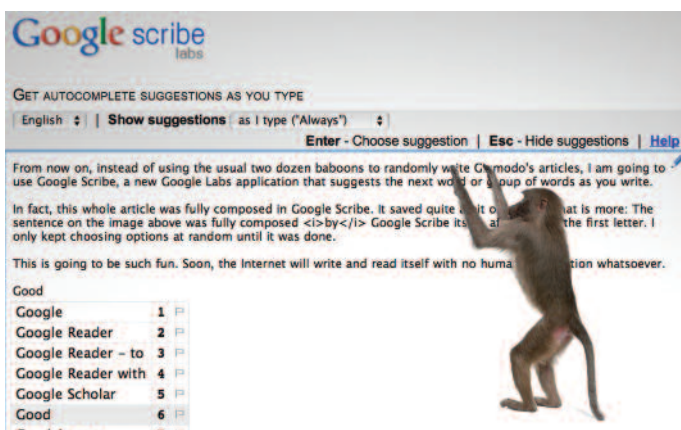
the most useful and powerful article writer software packages available. It is actually a browser-based subscription application so it works on any computer, it also claims to 'provide quality content at the push of a button'. It produces 'high quality' articles built around the topics and keywords that its users give it. Article Builder creates each piece of writing by weaving together snippets to build articles based on chosen category and sub-topic choices. The database which supports this product contains tens of thousands of categorised snippets. Running the program and selecting a few 'choice', keywords, topics and sub-categories, will in theory generate unique articles!

Even Google has an auto-writing product called Google Scribe which helps you write more efficiently by suggesting common words and phrases as you type, though it won't generate whole

articles. Google Scribe supports Arabic, Dutch, English, French, German, Hungarian, Italian, Polish, Portuguese, Russian, Spanish and Swedish. The language is automatically detected using the text in the post. Enabling Google Scribe is as easy clicking the pencil icon in the toolbar of your Google web browser within the Post Editor. After Google Scribe is turned on, suggestions will appear in gray as you type, and you can accept them by hitting the spacebar or by typing a punctuation mark.

The next time you spend 30 minutes or so reading through the content of your favourite blog poster, consider that the content may, in actual fact, have been generated in seconds with no human thought involved, from a desktop PC running an automatic writing program.

How many published research papers are generated in this way? Could this be a threat which is even more serious than plagiarism? Judging by the quality of some of the papers, I have read recently, this may actually significantly improve their legibility and understanding. (Ed)

http://articlebuilder.net/?id=listechinc

http://www.instantarticlewizard.com/

http://www.ticalc.org/archives/files/fileinfo/219/21940.html

<OR>

WICKED PROBLEMS ON YOUR KINDLE

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

The CogNexus Group has just announced that Jeff Conklin's book, *Dialogue Mapping: Building Shared Understanding of Wicked Problems*, has been released in electronic format on the Kindle platform.
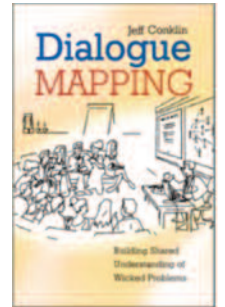
I'm not aware of many academic texts being released in this format, but it appears to be a positive step. Amazon is offering hard copies of the book for £28, but the Kindle version is just £6.52 (at the time of writing). In fact, the deal is potentially better for members of Amazon's Prime scheme; they can 'borrow' the book on their Kindle devices free of charge. Kindle apps will allow this to be readable on other platforms too.

<OR>

THE HUMOR COLUMN

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

A rare return to maths/O.R. related jokes this month. They will probably serve as a reminder why we don't do this type of humour too often.

Three statisticians went duck hunting.

A duck flew up and the first statistician took a shot. He missed, being a foot too high.

The second shot and was a foot too low.

The third shouted, 'We hit it!'

Did you know that 5 out of every 4 people have a problem with fractions?

Maths is like love; a simple idea, but it can get complicated.

A native American decides he needs an heir to take over his tribe when he's older.
So he makes love to his wife on a buffalo skin rug, and nine months later she has a baby boy.
However, just to make sure he decides a second son would be good. So he makes love to another wife, this time on a bearskin rug. Again, nine months later she has a baby boy.
Just to make doubly certain there's someone to lead the tribe when he's old, he decides he should have third son. So he makes love to another of his wives, this time on a hippopotamus skin rug, and this wife has twins.
It just goes to show that the squaw on the hippopotamus is equal to the sons of the squaws on the other two hides!

***** BREAKING INTERNATIONAL NEWS:
Teacher Arrested at JFK *****

A school teacher was arrested at John F. Kennedy International Airport this morning as he attempted to board a plane in possession of a ruler, a protractor, a compass, a slide rule and a calculator. At a press conference just before noon today, Attorney General, Eric Holder said he believes the man is a member of the notorious Al-Gebra movement, and he confirmed that the man had been charged by the FBI with carrying weapons of maths instruction.

'Al-Gebra is a problem for us', the Attorney General said. 'They derive solutions by means and extremes, and sometimes go off on tangents in search of absolute values. They use secret code names like 'X' and 'Y' and refer to themselves as unknowns but we have determined that they belong to a common denominator of the axis of medieval with coordinates in every country. As the Greek philosopher, Isosceles, used to say, 'There are three sides to every triangle.' The Attorney General went on to say, 'Teaching our children sentient thought processes and equipping them to solve problems is dangerous and puts our Government at risk.'

<OR>

THE FIFTH EUROPEAN CONFERENCE ON INTELLIGENT MANAGEMENT SYSTEMS IN OPERATIONS – IMSIO 5 (2013)

3-4 JULY 2013, THINK LAB, UNIVERSITY OF SALFORD, M5 4WT, U.K.

KHAIRY KOBBACY AND SUNIL VADERA

CALL FOR PAPERS: - there is still time to submit a paper! See the deadlines below and contact details of the organisers.

BOOK ONLINE: the booking facility is now open! Please go to www.theorsociety.com/IMSIO2013 to register for the conference and also to book for our Conference Dinner, which we are pleased to advise will be held at The Copthorne Hotel, Manchester on Wed 3 July 2013. Delegates will need to make their own arrangements for accommodation, however, the Copthorne Hotel are holding a limited number of rooms at fixed rates up until end of May 2013. Please go to our website above for further details.

PLENARY SPEAKER:
We are pleased to welcome a most eminent Plenary Speaker to our conference, **Professor Qiang Shen** who is the Director of the Institute of Mathematics, Physics and Computer Science at Aberystwyth University. He is a Fellow of the Learned Society of Wales and member of the UK Research Exercise Framework (REF) 2014 panel on Computer Science and Informatics.

Professor Shen's current research interests include: computational intelligence, reasoning under uncertainty, pattern recognition, data mining, and real-world applications of such techniques for decision support (e.g. crime detection, consumer profiling, systems monitoring, and medical diagnosis).

He has authored 2 research monographs and over 300 peer-reviewed papers, including one which received an IEEE Outstanding Transactions Paper Award. He has been the first-supervisor of over 40 PhDs/PDRAs, including a British Computer Society Distinguished Dissertation Award winner.

The title of Professor Shen's presentation will be - 'Feature Selection in Intelligent Information Systems'

Call for Papers
Operations management poses a number of problems of significant complexity whose solutions would lead to more effective operations and bring significant economic benefits. Their solutions, however, require novel approaches that are based on techniques and principles from both Operational Research and Artificial Intelligence. As business and industry become more global, diverse and market driven, the drive for more effective solutions for problems in operations management increases. Using traditional O.R. techniques alone has long been recognised as being too restricted for many applications, leading to research on the use of a combination of AI and O.R. techniques for problems in operations management.

This will be the fifth in a series of conferences that aims to bring together researchers developing and applying techniques from AI and O.R. to problems in operations management. This conference, to be held in the Think Lab at Salford University, aims to bring together researchers and practitioners working on the challenging problems in operations management that are at the O.R.-AI interface.

Researchers and practitioners from industry and academia are invited to submit papers in all areas related to aspects of design, development, testing and implementation of intelligent management systems in manufacturing and service operations covering but not restricted to:

• Media Operations
• HealthCare
• Knowledge Management in Operations
• E-Business and E-Manufacturing
• Finance and Credit Scoring
• Logistics
• Maintenance and Fault Diagnosis
• Scheduling and Capacity Planning
• Supply Chains and Inventory Management
• Process Design, Quality Management & Control
• Operations and Control of Intelligent Buildings

Papers describing case studies utilising or evaluating AI techniques such as Neural Networks, Data Mining, Knowledge Discovery, Semantic Ontologies, Knowledge Based Systems, Case Based Reasoning, Fuzzy Logic, Bayesian Networks, Agent Technology as well as Hybrid Intelligent techniques are particularly encouraged.

Key Dates & Extended Deadlines
* Indication of intention to present a paper A.S.A.P.
* Extended abstract of around 500 words to be submitted by **01 March 2013**
* Accepted papers to be notified by **05 March 2013**.
* Full papers to be submitted by **01 April 2013**.

Organising committee
Khairy A. H. Kobbacy, University of Salford (Chair)
Sunil Vadera, University of Salford (Co-Chair)
Hilary Wilkes, Conference Organiser, the OR Society
www.theorsociety.com/IMSIO2013

Submission Procedure
Send intent to attend/submit a paper or abstract to:
Khairy Kobbacy or Sunil Vadera,
The University of Salford,
Salford, M5 4WT UK.
EMail: k.a.h.kobbacy@salford.ac.uk; s.vadera@salford.ac.uk

<OR>

::::::: **LEADER** ::

ACCREDITATION AND CERTIFICATION

STEWART ROBINSON (PRESIDENT ELECT),
LOUGHBOROUGH UNIVERSITY

'I had been supportive of the idea of accreditation when it was going through the OR Society Council more than 10 years ago.'

After many years of procrastination, I finally got round to applying to be a Fellow of the OR Society late last year.

I feel confident to say this now as I have recently learnt that my application has been approved. There was some sense of guilt around my application. I had been supportive of the idea of accreditation when it was going through the OR Society Council more than 10 years ago. I have ever since been meaning to put in my application, but it has simply been one of those things that I never got round to.

The truth is that applying was not an onerous task. I actually completed the form relatively quickly while sitting in a hotel lobby waiting for a flight home (but don't tell anyone!). I was left wondering why it had taken me so long to get round to this relatively simple task. It is like one of those DIY jobs in the house that you put off and put off, but when you finally get round to doing it, there is a real sense of satisfaction. As a friend once said, 'you need a round tuit' and then produced one (pictured below).

In summary, I would encourage members who have been procrastinating as I did, to also get a round tuit. I don't mean the plate, but to put in an application for accreditation. It really wasn't that hard.

On a related theme, the reason why I was waiting in a hotel lobby was that I had just been attending the INFORMS conference in Phoenix, Arizona. One of the key things I did while at the conference was to attend a couple of meetings on the new INFORMS Analytics Certification. This is quite different to our own accreditation and consists of an examination which tests a range of

: : LEADER : : : : : :

skills. These 'domains' as they are described cover (figures in brackets are the percentage weighting): business problem (question) framing (15%), analytics problem framing (17%), data (22%), methodology (approach) selection (15%), model building (16%), deployment (9%) and life cycle management (6%). Interestingly this is a mix of traditional O.R. quantitative skills and the softer skills required for effective O.R. interventions e.g. problem framing.

Part of the discussion in the meetings was around how training and education in the softer skills could be given. I couldn't help reflecting on the fact that UK O.R. has for a long time had a particular strength in researching and developing those skills in students through our emphasis on soft O.R. and O.R. methodology.

Maybe there is something we can offer here?

It remains to be seen how successful the INFORMS Analytics Certification will be. The first exam will take place in April just before the INFORMS Conference on Business Analytics and Operations Research. I am not convinced that this is something the OR Society should be attempting to replicate, but we need to keep an eye on these developments in order to ensure that we provide the best service possible for our membership.

For those wishing to know more about the INFORMS initiative then visit the website at www.informs.org/Build-Your-Career/Analytics-Certification/

<OR>

: : : : : : NOTICEBOARD : :

NEWS OF MEMBERS

The Society welcomes the following new members,
ANDREW ARLOW, Hampshire; JONATHAN BUDZYNSKI, London; HELENE CLARK, Berkshire; ANDREW COOPER, Berkshire; ROSE DRUMMOND, Middlesex; SARAH ESLER, Fareham; MICHAEL HILL, Hants; AMR HASAN, Kuwait; MILES HUNT, Surrey; KONSTANTINOS KIOUSIS, London; RACHEL LESLIE, Hants.; SARAH LIVERMORE, London; NEIL MORRILL, Petersfield; JAMAL OUENNICHE, Edinburgh; KEVIS PACHOS, London; HARA PAPACHRISTOU, Warwickshire; JOSEPH POWELL, Fareham; ROBERT PULLEY, Aylesbury; NITISH RAMPARSAD, Surrey; RUPAL RANA, Leicestershire; CHRISTOPHER SAVOURY, Sheffield; SAMUEL SCOTT, Portsmouth; ASHLEY SMITH, Fareham; SIOW HIANG TEO, Republic Of Singapore; ASHLEY WALKER, Birmingham; ALASTAIR WILLIAMS, Stourport on Severn; MONIKA ZIOLA, London;

and Reinstated members,
PEDRO CRESPO DEL GRANADO, Lancaster; JAMES BOFFIN, Berkshire; CLAIRE DOBBINS, Newport; IMUWAHEN EGBE, Glasgow; JAMES FREEMANTLE, Fareham; HARRY GARNISH, Essex; SIMON GOSS, Australia; MOZAFAR HAJIAN, Tunbridge Wells; KEITH HOY, London; STEPHEN JARRETT-SPRAGUE, Salisbury; CHIARA POLINGHORN, Fareham; STEVE PRETTY, Surrey; RICHARD TRELOAR, Hants; BING XU, Edinburgh;

and the following student members,
DESSY AMIRUDIN, Edinburgh; ANDREA BONFIGLIOLI, Italy; CHIARA BORDIN, Italy; SHANYUN CHU, Liverpool; KAI-SIMON GOETZMANN, Germany; DARYA MUZYCHAK, London; JUN-GUAN NEOH, Southampton; EMMANUEL NJOKU, Barking; ELENA PERSHINE,

Edinburgh; RACHEL PURKESS, Southampton; XINGZHEN REN, Leicestershire; GEORGIOS SOTIROPOULOS, Coventry; SEBASTIAN VILLA BETANCUR, Switzerland; JUNWEI ZENG, Lancaster; EREN OZCEYLAN, Turkey;

Total Membership
2339

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)
Chiara POLKINGHORN
Michael FOX

Admit to the category of Associate (AORS)
Alexander SHEEN
Nicholas BELL

Admit to the category of Fellow (FORS)
Kees VAN HAPEREN
Stewart ROBINSON
Josephine MORRELL

<OR>

Professional development opportunities for 2013
Approved courses in O.R. and Analytics

SUPPORTING STRATEGY

6-7 March, Birmingham
£1,040 + VAT for OR Society members
Hands on course

Course provider:
Frances O'Brien and John Morecroft

This is a practical course aimed at developing expertise in deploying frameworks, methods and models to support strategy development. The course looks at the use of manual and computerised techniques for conducting various strategy development activities such as setting direction, creating strategic initiatives, making sense of internal and external environments.

Roles for O.R. Supporting strategy: Current practice; Frameworks for setting direction and measuring performance; Get an introduction to system dynamics; Learn about formulation and simulation; Undertake modelling for strategic development

IMPROVING QUALITY AND PERFORMANCE WITH THE PUBLIC SECTOR SCORECARD

12 March, Birmingham
£500 + VAT for OR Society members

Course provider:
Sheffield Hallam University

Gain a greater understanding of the topics of quality, excellence and performance measurement and the need for performance measurement to be based on stakeholder needs, the organisation's strategy and process; appreciate the debate on targets in the public sector and the eight essentials of measurement.

Find out about the latest developments in performance measurement; Keep up-to-date with developments in quality management and developing quality user-focussed public services; Learn how to use the balanced scorecard and strategy mapping

BUSINESS INTELLIGENCE WORKSHOP

13 March, Birmingham
£585 + VAT for OR Society members

Course provider:
Dweomer Consultants Limited

Understand the basic capabilities and limitations of OLAP tools, how they differ from other reporting and analysis tools and the change management issues raised when they are introduced; how and why the design of a data warehouse needs to be different from other data processing systems; learn how to use dimensional modelling techniques and understand the key challenges and trade-offs faced in managing a successful business intelligence / data warehousing initiative.

Understand the technical, political and change management issues that need to be addressed to benefit from investing in business intelligence and data warehousing; Get an opportunity to discuss the issues facing your organisation and exchange ideas with other delegates and the course tutor

FACILITATION SKILLS

14 March, Birmingham
£440 + VAT for OR Society members

Course provider:
Rachel Bodle

A course where both beginners and those with some experience can review and practice the skills needed to add value at the interface with clients and other project stakeholders. Frameworks for structuring a group process; practical insights to some of the tools available to support group interaction; hexagon mapping techniques; enhanced awareness of own skills and activities to address development needs.

Valuable opportunity for delegates to practise specific skills and learn from supportive peers; Professional development: facilitation skills are a key component of the interpersonal skills needed for more influential, strategic roles; These skills are at the heart of managing client relationships

SIMULATION: A PRACTICAL GUIDE TO DEVELOPING AND USING MODELS

19-21 March, Birmingham
£1,680 + VAT for OR Society members
Hands on course

Course provider:
Loughborough University

If you develop and use discrete-event simulation models in your work, this course will enable you to top up on the skills required for successful simulation modelling and analysis. You'll learn how to build valid and credible simulation models and perform experiments with models to compare the results of different scenarios appropriately and efficiently.

Learn how to determine what to model and what not to model; Find out how to collect and analyse the data needed for a model; Gain an understanding of the approaches for verifying and validating a model; Learn how to carry out experiments to obtain accurate estimates of performance; Methods of running and comparing multiple scenarios

INTRODUCTION TO O.R. I

15-19 April, Birmingham
£2,850 + VAT for OR Society members
Hands on course

Course provider:
Frances O'Brien, Stewart Robinson et al

Understand the role of Operational Research in management; understand the requirements for successful Operational Research interventions; have knowledge of a range of Operational Research techniques; be able to identify the suitability of a technique for a problem situation and be able to apply those techniques.

O.R. and the O.R. process; Statistical methods in O.R.: sampling and regression; Simulation; Optimisation and (Meta-) heuristics; Statistical methods in O.R.: forecasting

To book online, visit www.theorsociety.com or call Jennie Phelps on 0121 234 7818

[ ]

Dstl is one of the principal government organisations dedicated to science and technology in the defence and security field.

Senior Dismounted Soldier Operational Analyst

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You should have a strong numerical background and a degree, higher degree or equivalent experience in a Systems, Technical, Engineering, Analysis (Operational) or Mathematics discipline. Considerable experience of Systems Engineering/Analysis and Operational Analysis project work is essential, together with proven ability to lead technical programmes and integrate different skill sets.

Job reference: 24331. Closing date: 11 March, 2013. Open to UK Nationals only.

Please go to www.dstl.gov.uk/vacancies to download a Dstl Application Form.

Email this in MS Word format to HR Business Services dstlrecruitment@dstl.gov.uk quoting the vacancy reference in the subject line

POSITIVE ABOUT DISABLED PEOPLE

INVESTOR IN PEOPLE

[dstl]

Dstl is part of the Ministry of Defence

Defence Science and Technology Laboratory – Maximising the impact of science and technology for the defence and security of the UK.

CAN OPTIMISING A SIMULATION BE USED TO OPTIMISE REALITY?

JOHN CROCKER

One of the papers presented at the 2012 Winter Simulation Conference (WSC2012) in Berlin was given by Professor Michael Pidd on the theme of combining simulation with other methods.

He started by pointing out that in the real world problems do not come with a label as to which method should be used. In the early 1970's we had a maxim: 'If it moves simulate it; if it doesn't use LP'. I have also heard a variation on this: 'If it moves simulate it; if it doesn't then make it move'.

Apparently, Ackoff and Sasieni said, 'Models *represent* reality, simulation *imitates* it' in their 1968 seminal book (*Fundamentals of Operations Research*). In those early days, it was generally recognised that one could not optimise via simulation. To find the 'best' solution (layout, policy or whatever) it would be necessary to change the [simulation] model and re-run it. This would be extremely tedious and very much at the mercy of the modeller's imagination – what possible policies/layouts could one adopt – and, of course, it was also dependent on his or her ability to change the code to reflect these alternatives.

The problem with optimising based on the outputs of a simulation is that these outputs are stochastic. In essence, each evaluation is a point within a hypersphere, the centre of which is unknown and the position of the given point relative to this centre is also unknown (and you thought it was only Heisenberg who was uncertain). One can reduce the size of the sphere by increasing the number of replications. This will more precisely pinpoint the centre of the sphere. Unfortunately, more replications do not necessarily correspond to more accuracy. If any of the input assumptions either in the form of data or in the way the model interprets reality are incorrect then more replications simply more precisely puts the centre in the wrong place.

If c_1, c_2 and c_3 are the estimates of the cost function for three sets of input parameter values from one set of replication and d_1, d_2 and d_3 are the corresponding estimates from a different set of replication (i.e. one using different sequences of random numbers) then it is quite possible for $c_1 > c_2 < c_3$ and $d_1 < d_2 > d_3$. In the first case, there would appear to be a minimum between c_1 and c_3, in the second case there is an apparent maximum between d_1 and d_3. It is even possible for $c_1 < c_2 < c_3$ while $d_1 > d_2 > d_3$. This effectively renders any quasi-Newton method useless.

Genetic algorithms or heuristics offer a possibility but these tend to require a large number of cost function evaluations which for a complex model could take a very long time. One of the problems with using a GA approach is that it can often take longer to 'tune' the parameters of the GA than it does to solve the original problem. For example, having selected a particular child to become a parent in the next generation should its cost function be re-evaluated. If so should the average, latest, lowest or highest of the evaluations be used? The average would seem the most sensible but should this be given a different rating to those values calculated using a different size sample.

Assuming a minimum has been found we should now test this. How sensitive is this result to the random numbers used, to the values the parameters that have been optimised and to the values of any other parameters that were kept constant during the optimisation?

Finally, we should ask the question, is this solution significantly better? If it requires a change in policy, are the likely savings worth the effort? If it is a change in decision values, should these be made retrospectively and if so what would be the repercussions? How long is it likely to be before there will be a discernable (hopefully, positive) effect?

In William Rees-Mogg's recent obituary, he was reputed have said whilst editor of *The Times*, 'It is not my job to be right; it is my job to be interesting'. If I am wrong, please let me know, perhaps we can get some form of debate going on this issue.

<OR>

> 'In the early 1970's we had a maxim: 'If it moves simulate it; if it doesn't use LP'. I have also heard a variation on this: 'If it moves simulate it; if it doesn't then make it move'.'

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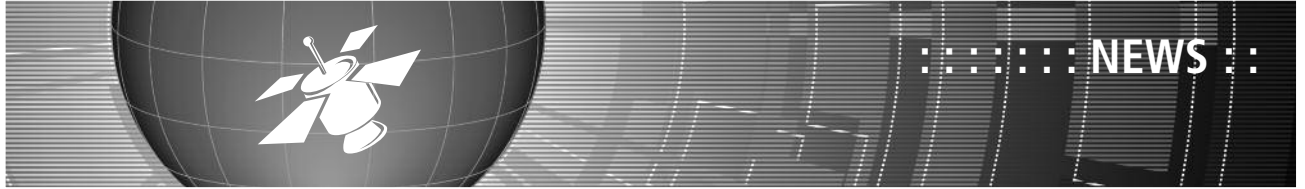
CAREERS OPEN DAY 2012

NIGEL CUMMINGS

O.R. practitioners share their experiences and talk about what working in O.R. is like at their organisation.

The Careers Open Day offers students the opportunity to glean further insights into careers in O.R. through the programme of informal presentations that run in parallel with the careers exhibition. The presentations are given by O.R. practitioners who are at various stages in their careers and thus able to speak with authority and candour about their first hand experiences of a life working in O.R.

Vince Knight and Tom Dawson

Apart from the change of venue though, our winning formula remained largely the same - this was a meeting place of like minds for one day in November, to meet other O.R. Students, engage with O.R. professionals, and explore the many opportunities for future employment available from companies utilising and specialising in O.R. based activities.

The welcome and introduction on behalf of the O.R. Society was given by Vince Knight who was ably supported by our education officer Louise Orpin. All the talks were given in the Adams Conference Room and they began with a presentation by our President Geoff Royston. The theme of his talk was 'A life in O.R.' which certainly proved inspirational as it gave Geoff the time to talk about and illustrate various stages in his career, a career which had risen to great heights over the years.

Geoff Royston

Geoff began by talking about how O.R. was an 'improvement science', it was not he said about conventional sciences, physics, biology etc., which were more 'knowledge for their own sake sciences' O.R, he said was most interesting because; 'It actually leads you to something, to something better, and our tagline is the Science of Better, it's a science of improvement, and it is interesting because it looks at systems and not only things but also people and quite complicated systems at that!'

Geoff also spoke about the effectiveness of the application of Operational Research during wartime; it had first risen to prominence during the Second World War when it provided some of the tools necessary for the Allies to win. Today O.R. has an important role to play in industry, in the utilities markets, in the financial world, in manufacturing, in academia, and in developing systems of analysis which could pragmatise problems and provide real answers quickly and efficiently for stakeholders in a 'real-world' as well as in defence.

Tom Bandy

The second presentation was given by Tom Bandy of DSTL; he spoke of his migration from being a chemist after graduation to becoming an analyst in the Operational Research department at DSTL. He said that he had done chemistry at school and really enjoyed it, then he went on to take a degree and ultimately a Ph.D. but afterwards he realised that he didn't really want a career in it! 'I was looking at options and actually, one feeling that I had was there were lots of other opportunities out there including Operational Research'.

Tom chose Operational Research and quickly realised he had made an excellent career choice. He had already had the opportunity to work on many and varied projects. He said, 'DSTL was an interesting place to work, because his department had specialists representing many different sciences all working together to find solutions and better ways to solve problems common to their business'.

The next presentation was given by Sabine Veidemane and Daniel Welsh from British Airways. Their presentation was designed to illustrate how Operational Research can provide a multitude of resources and tools from which to draw upon to solve problems commonly encountered in the air transport industry.

Sabine Veidamane

Sabine said she had joined BA immediately after qualifying from University in 2011, she had initially taken her Bachelors in management science with economics and she had also worked for a year in HM revenue and Customs as a student operational researcher. Her role in BA, after working there for a relatively short time, was that of consultant supporting the airline partners team making sure that agreements and other relationships with other airlines were beneficial to BA. Daniel Welsh had been at BA a little longer, around four years, his work had originally concerned networks, but currently he was in a department dealing with fleet planning.

Sabine continued with a short talk about BA and how O.R. was used extensively across the business to provide solutions to a wide and varied range of problems. She said that some of the areas that she had worked in so far had included problem structuring, 'I think every different project that we work on requires problem structuring because quite often the initial project briefs that we get are quite vague'. Spread sheet modelling was also commonly used in BA's O.R. department, as an aid to forecasting. Daniel also spoke about some of his recent work in procuring aircraft for BA. His message was clear, working for a company like BA enabled him to enjoy variety in his work and also to utilise the many tools and techniques that O.R. had to offer.

Sabine also said standard O.R. optimisation techniques were often used at BA to allocate aircraft en route to make sure that revenue was maximised. Simulation was often used to gain some indication of passenger flow throughout airports to and from destinations; this was useful she said in deciding how many terminals were needed to cope with passenger flow. BA also utilised statistical analysis in the commercial side of its operation to determine the impact of marketing campaigns and to refine customer segmentation and achieve maximum profitability.

Sabine said that as well as the variety of work offered at BA, the O.R. Department was also seen as a very good springboard from which to move into other areas of the business, such as management and strategic posts.

Operational research in government was the topic taken on by Tom Dawson from the Government Operational Research Service (GORS). He spoke about working in the Department of Works and Pensions. O.R. he said played a very important part in the civil

'The O.R. Department was also seen as a very good springboard from which to move into other areas of the business'

service - any graduate leaving university with appropriate qualifications could expect to find a rich and varied climate of O.R. oriented work in government. Additionally, career progression was encouraged and it was quite possible therefore, to move across into many other departments and fully utilise the widest variety of O.R. techniques and tools. There were he said, 'Considerable opportunities for those who enjoyed modelling, forecasting and analysis'.

Vicky Chase

The final presentation was given by Vicki Chase, National Air Traffic Services (NATS). She spoke about the role that NATS provided for the airline industry – there were many systems to coordinate, and O.R. played an extremely important role in optimising efficiency of such systems. 'Air traffic control was', she said, 'More than just about the airports, we actually control the whole of the UK's air traffic, we know everything about any plane that is flying in UK airspace and that means we have to deal with a huge amount of data.'

A considerable amount of optimisation took place at NATS; this was needed in order to avoid penalties incurred by late running aircraft impacting on other airline services. A lot of work was done on setting targets and proving and measuring those targets. These targets in terms of business, relate to either a nice bonus or a nasty penalty! So it's very important that we have the best data and the best figures so that we can make the best decisions'.

From an O.R. perspective NATS made frequent use of simulation technologies. Environment was becoming a really big area of work too, consideration had to be given to emissions and carbon footprints, and there was also a lot of work going on there, in developing applications which could be used in arriving at solutions for environmental issues common to the airline industry.

Our careers open day with its presentations and careers exhibition provided those who attended with all the best reasons to consider a career in Operational Research.

<OR>

KIM2013 PROGRAMME

BRIAN LEHANEY

The provisional programme for KIM2013 is now available at
http://www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013Programme.aspx

There are two packed days, with three excellent plenary speakers and around sixty delegate presentations. There will be as many as four parallel talks in any one session. The conference is not streamed and delegates will be free to attend any of the presentations. The conference has attracted a wide range of delegates from many different countries and from various sectors of the economy. It promises to be a very interesting event.

We are also pleased to acknowledge our sponsors, Palgrave Macmillan, publishers of the OR Society and sponsors of the KIM2013 drinks reception where we are celebrating the first decade of publication of *KMRP* .

The first day will be opened by Geoff Royston (OR Society President) and Brian Lehaney (Conference Chair). This brief opening will be followed by Speed Networking, so please be ready to interact very early in the conference, and please bring plenty of business cards!

Between sessions please visit the exhibitor and poster area while you enjoy your refreshments.

Submission of full conference papers and papers for the KMRP SI is now closed.

You can still submit an abstract and title for presentation up until 8 March.

The heavily discounted early bird booking rate closes on 8 March. Book now and save!

Remaining Key Dates

1 Mar	Notification of outcomes of reviews of conference papers
1 Mar	Notification of outcomes of reviews of KMRP SI papers
8 Mar	**Deadline for early bird bookings**
11 Mar	Standard booking opens
12 Apr	**Deadline for final conference manuscripts for proceedings**
12 Apr	**Deadline for author, exhibitor and sponsor bookings in order to appear in the programme**
26 Apr	Final programme
17 May	**Deadline for receipt of printed leaflets for distribution**
3 Jun	Pre-conference evening
4 Jun	Conference starts
5 Jun	Conference ends
1 Jul	Deadline for final KMRP SI manuscripts

A bar quiz will be available for those of you who will arrive on Monday 3 June (pre-conference evening), and there will be a range of prizes. You will be stunned when you see them!

Arden Course

The gala dinner is at the venue, which is the wonderful Marriot Forest of Arden Hotel in Meriden. As its name suggest, Meriden is 'in the middle' of England. If you have the time, take the opportunity to look around this truly historic area, with the Heart of England Way long-distance path that brings the Staffordshire Heathlands together with the Cotswolds and Forest of Arden. For those of you who are prepared to travel a little further, Birmingham provides a host of international restaurants and entertainment. The venue is home to the Championship Arden Golf Course, which has played host to a succession of international tournaments, including the British Masters and the English Open.

I look forward to seeing you at KIM2013. Book now at www.theorsociety.com/KIM2013!

<OR>

LEARNING O.R. ON THE JOB: RECENT EXPERIENCE IN THE LOCAL NHS

CHRIS SMITH

In the first meeting of the new year, EMORG were very pleased to welcome David Gilding who recounted his experience of learning O.R. on the job – a subject close to the heart of many of his audience!

David Gilding has worked in the NHS for ten years and now heads up the Public Health Intelligence team for Nottinghamshire County. Before joining the Public Sector he worked in community development and voluntary sector support for local and national charities. With a degree in Mathematics-with-Engineering, he suspects that he has been 'doing O.R.' for most of his career, it's just that no one told him so!

Over £8 billion is spent on the NHS in the East Midlands each year. The processes to decide the best way to spend this money would seem to be fertile ground for O.R., yet the application of formal modelling, simulation and other O.R. techniques in local NHS commissioning is extremely rare. David described recent projects in which NHS Nottinghamshire has started to use O.R. methods and reflected on his journey of learning O.R.

The drivers to review the service provided by walk-in centres and accident & emergency were duplication, value for money and equity. Current flows were modelled and a number of options assessed: expand walk-in centres; integration of walk-in centres and accident & emergency units and closure of walk-in centres. The views of the public, patients, partner organisations and clinicians all differed but simulation and financial modelling gave some objectivity to the decision, which ultimately was to integrate the services.

When asked to look at flows through mental health rehabilitation units, it became apparent that there were no – or very low flows – through the system. This prompted another change of approach and David investigated whether system dynamics could help. This qualitative approach did prove very helpful for all stakeholders to understand what was happening and how improvements could be made.

And finally David looked at care for children with complex needs. It was felt there are unnecessary delays, duplication of provision and everyone acknowledged that care could be better coordinated. The diversity of stakeholders made it difficult to use flow or system dynamic models previously applied. This prompted yet another move to soft systems methodology and what it could offer the stakeholders and improving care for children. Initial results have been encouraging and learning on the job continues!

However, David expressed some nagging doubts about whether many of the organisational projects he has been involved with are public health and whether he should be looking at such issues as health inequalities, lifestyle factors and their impact on health. Sounds like some more techniques to learn on the job.

Reflecting on his journey, David said that he often felt isolated, working without O.R. support within the organisation. Techniques have been learnt to match the problem under consideration. Much of the discussion at the meeting was how support could be given to people in David's position. Members felt that there should be better ways to share similar work amongst both the NHS and O.R. communities. Some food for thought for the OR society.

Members found the talk both inspiring and encouraging. David has clearly been making a real difference to health services in Nottinghamshire. But it is all change for David. Nottinghamshire PCT is being abolished and David will be moving to work in public health for the County Council. How this will affect David's work and the application of the approaches he has developed is uncertain.

EMORG's next two meetings both have a sports focus: Transport Analytics at the 2012 Games on 13 February and Sports Analytics at Leicester Tigers on 12 March. Contact EMORG secretary for more details.

<OR>

SIR HENRY TIZARD PART 8

JOHN CROCKER

Although most of Tizard's work had an immediacy this did not detract from his on-going interests and involvements in such projects as nuclear fission and the jet engine.
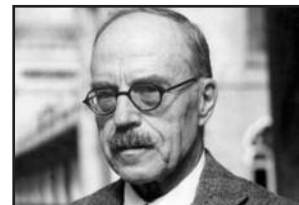
He believed that a nuclear device was unlikely to be ready in time to have any effect on the outcome of the war. Professor Lindemann was, on this issue, at least, in agreement but both saw that work on this was essential in case the Germans were ahead in their research. Sir Henry felt that this work should be done in North America to avoid it taking valuable resources (scientists) away from the more urgent tasks in hand, i.e. winning the war. Interestingly, the work being done in the USA indicated there would be no war use for uranium but would likely provide a source of power of indefinite life. By contrast the findings of the MAUD committee were quite the opposite. Two French scientists, who had managed to escape occupied France, were very close to proving a chain reaction was possible whilst Chadwick, Frisch and Peierls had determined the immense explosive power of such a reaction. The committee, with the exception of Blackett, believed a bomb could be produced within 2 years at a cost of £5 million. Tizard believed this to be far too optimistic. Both he and Cherwell hoped that it would not work whilst Lord Hankey was expressing concern as to whether any Government would use it.

After the war, Tizard commented, 'It was indeed fortunate that the atomic bomb and the long-range rocket were publicly demonstrated before the end of the war, although they had very little effect on its outcome. They opened wide the eyes of the people of the world who otherwise might have gone happily to sleep again while such weapons were developed in secret.' He also expressed the wish that its existence and power 'could have been made in a way less shocking to the civilized world'.

His thoughts on the gas turbine were somewhat different. When in the spring of 1941, news of the first jet-powered flight reached him, he exclaimed, 'History has been made'. He immediately started to map out its future, including thoughts on the by-pass system and foreseeing the 1960s as the 'jet age'. In July, Churchill suggested starting work on producing a thousand Whittles – in fact these would be made by the Gloster Company. Tizard was keen to pass on the details of the engine to all the major engine manufacturers in the UK to maximise the number of experts looking at it and hence able to sort out and resolve problems. Naturally, Whittle was somewhat less enthusiastic wanting to maintain his intellectual property rights and hence his competitive advantage.

Apparently, throughout both the Civil Service and the RAF, if there was a problem of a scientific nature, it was generally accepted that Tizard was the person to consult. In early 1941, he held a meeting of pilots at Imperial College to discuss the current problems with night interception and another with 40 photographic experts where in both cases, as usual, he showed a remarkable knowledge and insight into the difficulties they faced.

There has been a great deal of debate and controversy over whether the Allies should have concentrated their bombing against civilian targets. Although Tizard was by no means averse to such a policy on moral or humanitarian grounds, he did not support the directive that RAF attacks were 'to be focussed on the morale of the enemy's civil population and, in particular, of the industrial workers' in the cities within range of the new navigational aid known as Gee. Indeed, on 11 August 1941 he had recommended the re-designing of bombs so that more of them could be carried in one plane based on the premise that accuracy was not essential when bombing urban areas.

The reason he was against this move was that he felt the Allies' long-range bombers should be put to better use by targeting German submarines ('u-boats') in the Atlantic. These were having a

> 'At a dinner at the College, although he was 'lively and amusing' his nervousness may have come across as giving the impression he was 'self-important and inclined to show off' – not qualities that enamoured him to the dissenting Fellows.'

devastating impact on shipping bringing vital supplies to the UK, without which the nation would have been starved of food, oil and the raw materials necessary for survival. There was a large area in the North Atlantic which could not be patrolled from either Canada or the UK simply because the aircraft of the day did not have the range. It was therefore essential to attack the u-boats in their lairs (along the French Atlantic coast) and as they were making their way to and from this lucrative hunting ground. This policy was strongly supported by 'informed scientific opinion' – in particular by Blackett, Director of Naval Operational Research, who had carried out a detailed statistical analysis of the situation. It is argued that the Battle of the Atlantic was won by far too fine a margin. However, to counter this, the air offensive against German cities ultimately led to an Allied air supremacy over Europe without which there could have been no hope of an invasion. Analysis of the effectiveness of night bombing raids had shown that the number of civilian deaths (in German cities) to be not significantly greater than the number of trained bomber crews and, the effect of German bombing on [UK] production and morale had also been surprisingly small. (Incidentally, according to Shirer's 'A Berlin Diary', the effects of UK bombing on the German civilian population appear to have been much more significant probably because the NAZI propaganda machine had guaranteed that no bomber would ever get through the defences.)

Lord Cherwell produced a paper in which he implied that Bomber Command could displace at least half the inhabitants of the 58 largest cities in Germany. Sinclair found the paper's calculations simple and convincing. Tizard, by contrast, wrote to Cherwell saying that the paper was extremely misleading and could have disastrous consequences if acted upon. Blackett, also produced a detailed criticism in which he suggested that Cherwell's estimates were at least 600% too high based on the timescales and forces expected to be available. Tizard also made the point that this level of destruction would require a much larger bomber force than was currently achievable and over a much longer time than the 12-15 months suggested.

On 12 March 1942, Professor George Gordon, the President of Magdalen College, Oxford died. It will be recalled that Sir Henry was Rector of Imperial College, indeed, this was the only job for which he received an income. Tizard's name was put forward as a possible replacement although the rumour factory had made him a less than attractive contender to some of the senior Fellows, particularly the non-scientists who felt he may not take to heart the great historical foundation. At a dinner at the College, although he was 'lively and amusing' his nervousness may have come across as giving the impression he was 'self-important and inclined to show off' – not qualities that enamoured him to the dissenting Fellows. There was also some concern about the level of involvement he had in his 'war duties' but despite all of these factors, on 25 July 1942,

he was, nonetheless elected President.

He received congratulations from the Secretary of State for Air, the Minister of Aircraft Production, Colonel Llewellin (who had recently replaced Moore-Brabazon), and Lord Hankey all of whom expressed their strong concern that he would not give up any of his other 'responsibilities'. At this time, these included Scientific Advisor to the Minister of Aircraft Production, member of the Aircraft Advisory Council, Radio Policy Committee, Air Interception Committee, Air/Sea Interception Committee, Bombing Committee, Air Fighting Committee, Torpedo Attack Committee and the Operational Research Committee.

During the summer of 1942, before really taking up his duties at Magdalen, his main interests concentrated on the battle to firmly establish the role of scientific advice in the running of the war and in improving the organization and operational use of radio and radar weapons being developed. In June 1942, he called the first 'Informal Meeting of Scientific Advisers'. This was to 'take stock of the situation and see whether we can help each other more than we are doing at present'. Darwin, Cockcroft, Fowler and Bernal were some of those who agreed and met regularly with Tizard.

Things came to a head in the summer when the Eighth Army was defeated in North Africa leading to the fall of Tobruk. A.V. Hill wrote in *The Times* that the inferiority of the British tanks was due 'to a system which has failed to anticipate future tactical requirements in guns, projectiles, armour and performance; failed to collect, analyse and profit by previous operational experience; failed sometimes even to obey the elementary rule that production must follow, not precede, development'.

Unfortunately Tizard's recommendation that if a Board of scientists be attached to the Defence Committee of the Cabinet with more authority than the existing Scientific Advisory Committee it would be a step in the right direction was not taken up. Instead three fulltime scientific advisers were appointed to the staff of the Ministry of Production – referred to by Tizard when asked to comment on the proposal as the 'Three Blind Mice'.

In the next thrilling instalment we shall see how Tizard influenced the field of Operational Research.

Clark, Ronald W., (1965), *Tizard*, Methuen & Co Ltd

Shirer, William L., (1941), *Berlin Diary,* Alfred A. Knopf

<OR>

OR55

OR55 ANNUAL CONFERENCE
THE UNIVERSITY OF EXETER FORUM, STREATHAM CAMPUS, EXETER EX4 4QJ

PHILIP JONES, JOINT-CHAIR

CALL FOR PAPERS

The planning for OR55 is well underway and the Conference Committee is in place to make sure things run smoothly.

We now need to encourage a supply of interesting, informative and challenging papers. Academics, practitioners, researchers and students with interests in any aspect of Operational Research are invited to present their work at OR55. Streams currently confirmed are:

- Community O.R.,
- Forecasting,
- Inventory Research,
- MCDA,
- O.R. Consultancy & Case Studies,
- O.R. in Education,
- Project Management,
- Sustainable Supply Chain,
- Queue Modelling,
- Green Logistics,
- Meta-heuristics,
- Routing Applications,
- Scheduling and IS&KM to name but a few.

Details are available on our website at www.theorsociety.com/OR55 and arrangements for a few more streams are expected to be finalised soon, so check the website for the latest information. Prospective authors are, of course, welcome to discuss proposals for papers with stream organisers in advance of submission.

Streatham Campus, Exeter University

Each stream is encouraged to have a Keynote paper or an Extended Abstract. Such a paper is expected to present a state of the art review of an area and discuss future directions for research in the field. Keynote papers and Extended Abstracts will be highlighted in the Conference Programme and will be allocated additional time in the Schedule. They can also be published in the Keynote Papers and Extended Abstracts Handbook and referenced with an ISBN number, if the speaker produces a full written version (maximum six pages).

As always the conference will provide ample space for people to meet and greet, to talk, discuss, think of new collaborations, research ideas and papers and, most of all, enjoy some time together. The conference will also be complemented by an appealing social programme including the ever-popular quiz night, trips to local attractions and the conference gala dinner. More details will be announced in this column and on the website in due course.

Sponsorship & Exhibition

There are many different ways to get involved with the conference as a sponsor or exhibitor. If you are interested in sponsoring any aspect of the conference or booking exhibition space then take a look at the options on our OR55 website or get in touch with Hara Papachristou on HPapachristou@lanner.com or Hilary Wilkes on Hilary.Wilkes@theorsociety.com

For more information please go to our website at www.theorsociety.com/OR55

<OR>

GO WEST - TO OR55 AT EXETER UNIVERSITY 3-5 SEPTEMBER 2013

PHILIP JONES – JOINT CHAIR

It's time to put it in your calendar, get your abstracts ready and make your online application for our annual conference, OR55. This year we're going west to the University of Exeter.

Views from Holland Hall

Exeter University is one of the most attractive campuses in the country, close to the historic City Centre and within easy reach of miles of stunning coastline and beautiful countryside. All that and there's cream teas and scrumpy too (moderation advised!).

We aim to provide a good balance between academic and practitioner papers, practitioner focused activities, thought provoking keynote speakers and plenty of opportunities to network. 'Papers' are mostly 20-25 minute presentations plus questions. We will be running the highly successful *Making An Impact* activity for practitioners again. We also encourage academics, practitioners and service providers alike to share your knowledge with interactive tutorials as well as papers. So whether you're an academic wanting to communicate your research or a practitioner wanting to develop your skills, there will be something at OR55 for you.

We already have stream organisers for Community O.R., Energy, Forecasting, Inventory and Logistics, MCDA, O.R. Consultancy and Case Studies, O.R. in Education and Project Management. All the latest details on streams and stream organisers can be seen at www.theorsociety.com/OR55 . If your speciality isn't listed, we're looking for more! Contact Kevin, Navoril or Hilary for more details.

More details of the conference are on the OR55 web page: www.theorsociety.com/OR55

<OR>

If you've got a question, or want to get involved, the OR55 committee is:

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FORRESTER RESEARCH IDENTIFIES ANALYTICS LEADERS

NIGEL CUMMINGS

According to Forrester Research, SAS, IBM and SAP are a step above the rest in the predictive analytics world.

Forrester Research also says that SAS, IBM and SAP are leaders in big data analytics and specifically predictive analytics. Forrester's evaluation of general-purpose big data predictive analytics solution providers was obtained using the 'Forrester Wave' set of algorithms which identified companies that analyse data, possess architectures that can handle big data and use tools that span the full predictive analytics life cycle.

The report says that of ten leading analytics software vendors evaluated, SAS was clearly 'an analytics powerhouse' and, along with IBM, an 'unshakable leader' in the analysis of big data predictive analytics solutions. SAS scored highest in each of the three categories: current offerings, strategy and market presence.

Jim Davis, SAS senior vice president and chief marketing officer, said in a statement, 'Since 1976, SAS has provided enterprises with the industry's most powerful analytics, which continue to support the world's largest data sets, now called big data.' SAS is well known for providing a 'High-Performance Analytics Server, SAS Visual Analytics and SAS DataFlux Event Stream Processing Engine'.

IBM while very successful in the analytics field is a relative newcomer having built up a portfolio of analytics enabled companies over the past few years. Unsurprisingly IBM has yet to catch up with SAS's provision of solutions and track record.

SAS's Enterprise Miner tool has become one of the most easy to learn analysis tools available, it can operate within databases or on distributed clusters to handle big data. Though according to Forrester, IBM's Smarter Planet campaign and acquisitions of SPSS, Netezza and Vivisimo represent a continued commitment to become leaders in big data predictive analytics. Forrester also says that IBM's complementary solutions, such as InfoSphere Streams and Decision Management, strengthen the appeal of their servicers for those firms that wish to integrate predictive analytics throughout their organisation.

SAP differentiates from other solution providers, like SAS and IBM, by putting its SAP HANA in-memory appliance at the centre of its consumer offering – this in-memory appliance provides users with a library of in-database predictive analytics routines. The company also offers a modelling tool that looks a lot like SAS Enterprise Miner and IBM SPSS Modeller.

A tier below the top three, Forrester listed Tibco, Oracle, StatSoft and KXEN as strong performers with unique approaches. In general, the strong performers had lower architecture scores than the leaders. Tibco's Spotfire advanced data visualisation tool offers core support for the S+ and R programming languages, which makes it attractive to data scientists. Forrester said that Oracle's analytics solution centred on offering in-database R programming combined with the strength of its in-database analytics technology.

StatSoft had a comprehensive number of analysis algorithms and was apparently very strong in manufacturing use cases, while KXEN had succeeded in 'collapsing' the normal predictive analytics life cycle by automating the predictive model discovery process; it also offered strong social network analysis.

In a tier below these were the 'contenders', which included Angoss, Revolution Analytics, and Salford Systems all of which it said had, 'a narrower focus'. Despite the narrower focus of these smaller vendors though, their customers apparently had good reason to consider them.

Forrester's research indicated that Angoss offered the best 'tooling' for decision trees and cloud solutions that firms can use to improve results quickly. Revolution Analytics on the other hand, appeared to focus more on being the de facto commercial provider of solutions based on the very popular open-source statistics programming language R; although other vendors in Forrester's evaluation offered or planned to offer R-based solutions.

Forrester's recent research clearly pointed out the leaders in the analytics marketplace, but it also indicated there were a large number of more specialised companies actively developing a presence in cloud and big data analytics solutions.

<OR>

DRIVING FURTHER AND FASTER, IN MOTORSPORT

NIGEL CUMMINGS

Analytics appears to be gathering momentum in velocity driven sports!

Speed combined with agility has long been a hallmark of F1 racing, so it is no surprise that advanced data analytics has been applied by some teams to exploit the new technologies available and raise performance levels.

F1 racing is a sport where one thousandth of a second can be the difference between victory and defeat. The Sauber F1 Team is amongst the first to utilise 'real-time data analysis' to help them shave those vital fractions of a second off lap times.

F1 race cars are known for their cutting edge, technology-driven designs. Drivers push cars to the limits reaching speeds over 200 mph (or 300 km/h). Those cars are also nowadays equipped with sensors, transmitters and data antennae which keeps every aspect of their performance logged. A modern F1 car is equipped with about 130 sensors, which are capable of sending enough information to fill several telephone books by the end of a two hour race. Thus it is no surprise that a resource so replete with data would eventually be subjected to analytics.

According to the Sauber F1 Team, during a typical race weekend, at least 25 GB of telemetry gets collected in total. Each of the cars running will be radioing immense streams of data back to the pits and often to the teams' headquarters. Analysis of the data—in context with the data the teams gather about their competitors—is absolutely critical to Sauber F1 team drivers getting their cars into the pole qualifying position and being first to see the chequered flag.

Every year, some 20 TB of data are collected, stored, and analysed. During the racing season which generally runs from March to November teams travel to 19 countries. Many of the teams like Sauber F1 now rely heavily upon data analytics to constantly innovate car design and racing strategies.

Much of the data comes from wind tunnel testing and software simulations, but the critical, real-world data is derived from the weekend's practice runs, qualifying, and the race itself. Data gets used during the race, when planning for the next race, and as the team design the cars for the following season.

To give it a competitive edge, the team uses what they term 'a FlexPod', essentially a data centre in a box. Its small form factor and low weight allows the team to take it around the world to every race; it's a reliable, mobile data centre that even operates in extreme weather conditions. The Sauber F1 Team bring their FlexPod to each race. Airfreight is a big added cost for races outside Europe, so having a small footprint, volume and weight, goes towards significantly reducing travel costs.

According to Magnus Frey, Sauber Motorsport's head of IT, the FlexPod's reliability is critical. 'Without the system at the race track running, nothing happens. We are not able to safely start the car.'

<OR>

ANALYTICS AND HADOOP VIRTUALLY INSEPARABLE BY 2015

NIGEL CUMMINGS

Better analytics may be achieved by utilising Hadoop programming.

Government analysis departments are increasingly tapping into the power afforded by the Apache Hadoop open-source programming framework to analyse large volumes of data. This trend has not gone unnoticed by analytics software developers, who it seems, plan to incorporate purpose-built, Hadoop-based analysis functions within all future applications. Hadoop uses the MapReduce programming framework to distribute queries of large data sets across clusters of computers, which can create an efficient, cost-effective approach to analytics.

According to Gartner Research, by 2015, 65% of packaged applications with advanced analytics will come embedded with Hadoop as Hadoop-powered analytics will help reduce operational costs and IT skills requirements as well as speed up the time it takes for analysts to derive real value from data. Technology providers, in turn, will be able to deliver more task-specific analytics by utilising Hadoop directly to turn analysis into actionable insights and decisions.

Also according to Gartner, by 2015, more than 30% of all analytics projects will deliver results based on structured and unstructured data. To date, business analytics have largely been focused on tools and technologies for the analysis of structured data. This is changing as government agencies and businesses try to gain insights from new and diverse data sources such as - audio, e-mails, text, social media, video and a variety of sensors.

Then by 2016, Gartner says that 70% of leading Business Intelligence (BI) vendors will have incorporated natural-language and spoken-word capabilities. BI and analytics vendors have been slow to provide language- and voice-enabled applications to date. When they port applications to mobile and tablet devices, BI vendors tend to focus only on adapting traditional point-and-click user interfaces to touch-based interfaces.

Over the next few years though, BI vendors will enable basic voice commands as standard interfaces, followed by natural language processing of spoken or text input into SQL queries. Ultimately, personal analytic assistants will emerge that understand user context, offer two-way dialogue, and maintain conversational threads.

Where did Hadoop come from and why incorporate it with analytics?

The underlying technology was invented by Google back in their early days so they could usefully index all the rich textural and structural information they were collecting, and then present
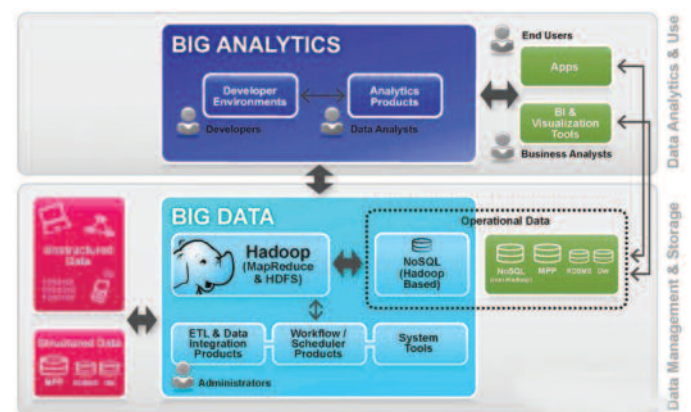
meaningful and actionable results to users. There was nothing on the market that would let them do that, so they built their own platform. Google's innovations were incorporated into Nutch, an open source project, and Hadoop was later spun-off from that.

Hadoop was designed to solve problems where there is a lot of data that does not fit nicely into tables. It is for situations where you want to run analytics that are deep and computationally extensive, like clustering and targeting.

Hadoop algorithms can be applied to a number of markets. In finance, for example, Hadoop can be used to produce an accurate portfolio evaluation and risk analysis. It can also be used to deliver better search answers to your customers so they are more likely to buy the 'things' you show them.

Hadoop was designed to run on a large number of machines that do not share any memory or disks. It can share out the work across servers automatically keeping track of the data sources enabling quick recovery if a server goes off-line. Hadoop can answer complicated computational questions dealing with large quantities of data from multiple sources because it can make use of multiple processors working in parallel.

<OR>

: : ANALYTICS : : : : : : :

OMNICHANNEL, THE NEW ANALYTICS MARKETING BUZZWORD

NIGEL CUMMINGS

Google have announced a free analytics tool which will ruffle the feathers of the 'paid-for' in the web analytics industry.
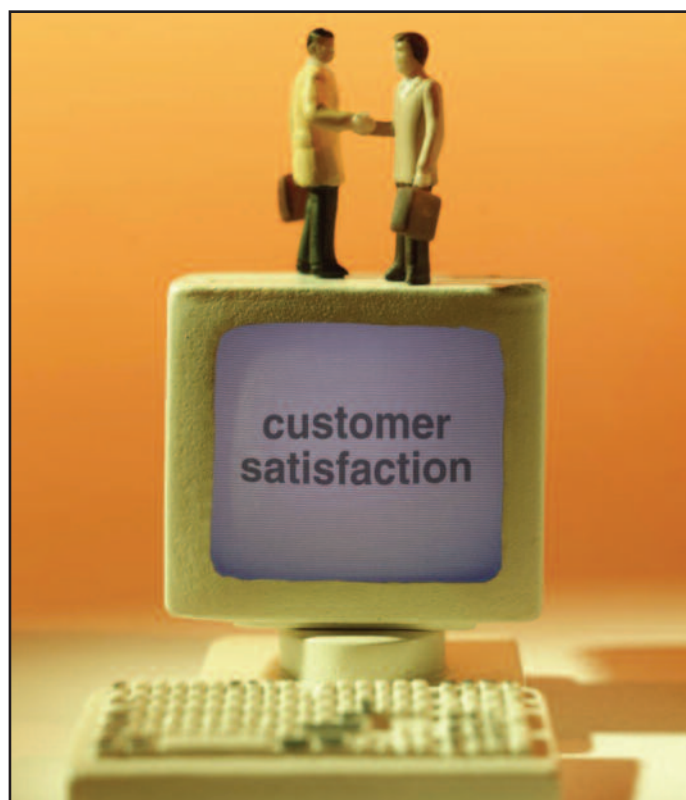
Omnichannel is all about knowing your customer. It attempts to keep track of every individual purchase of a customer whether this is made in-store, through mail order or electronically including any inquiries that customer has made. The aim is identify what it is that might persuade a given individual to purchase a particular item and then target that individual in such a way as to maximise the likelihood of him or her buying the product.

Universal Analytics is what Google is using to describe the changes they have made to how their free analytics tool tracks people visiting websites. This new term relates to research done by Google which revealed that people use multiple devices in a single customer journey.

Many of us receive text message or emails from companies urging us to connect with websites and gain a bargain. We often use such information, if it appeals to us, on a tablet or desktop PC to complete the journey of discovery and ultimately make a purchase. With a QR/barcode equipped scanner app one can get product availability and compare prices electronically while in the store and hence decide whether to buy now or go elsewhere.

Sending out 'choice messages' can be very hit or miss – some people will respond positively, others negatively and many will simply ignore these messages (often diverting them straight into their 'junk mail' box). Following any response through from handset to website to purchase has often eluded these companies that utilise choice message media as a means of selling their goods. New analytics technology means that companies will no longer lose track of the people. They will be able to tell whether the person has researched the product and whether they have bought it (no matter by what means).

Whether we like it or not, we are now in the age of convergence analytics. There will still be some data challenges, but if you can encourage your visitors to sign in to your site, you are going to have access to a free tool that can track your customer's behaviour using multiple devices. This is the age of the Omnichannel and 2013 is likely to be the year of the Omnichannel marketing buzzword.

Omnichannel represents a change in measurement protocols and a philosophy that all data is good data that could provide further commercial benefit. Google is now allowing its analytics tool users to merge CRM data into Google Analytics. As a tool for analysis this represents a considerable step forward, as now extra data can be pulled into the system. Using such data in this way might allow businesses to target content for website visitors based on all purchases previously made via whatever medium.

The data-mining possibilities have just expanded exponentially. If you are a good analyst, you could have a lot of fun optimising advertising spend across all channels from brand campaigns through to retargeting. Previously this functionality was only available in Google's paid-for packages. Because this technology has been rolled out free of charge by Google, we can all build predictive models (if we want to).

This is a remarkable piece of free software and must be causing their competitors enormous headaches in trying to keep up and in trying to find ways of persuading people to spend money on their offerings – how do you compete with someone who doesn't charge!

More information can be obtained from: www.google.co.uk/analytics/

<OR>

::::::::NEWS : :

JOS TO BE INCLUDED IN CITATION INDEX

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

I'm delighted to announce that the Journal of Simulation (JoS) has been accepted for inclusion in the Thompson Reuters ISI Science Citation Index, and as a result will receive its first impact factor this summer when the new figures are released in late June.

The impact factor is a measure of how frequently a journal's articles are cited by other academic papers, and is often used as a proxy for the relative importance of a journal within its field.

This is an important milestone in establishing a journal's status, and I'd like to thank the team of past and present editors, Stewart Robinson, Simon Taylor, John Fowler and Loo Hay Lee, and all of its contributors.

<OR>

EMORG – SPREADING THE O.R. WORD

ANTUELA TAKO, GILLIAN GROOM

We are looking for help from you! Do you know of anyone in the East Midlands who is doing research in or uses Operational Research or Advanced Analytical Techniques in their work that might be interested to take part in our showcase event? Please let us know so we can get in touch and send them an invitation.

The East Midlands O.R. Group (EMORG) is becoming a vibrant and active group, with several talks and events already organised for 2013, however we would like to share the O.R. word with more than just our relatively small group. To do this we have decided to hold an early evening networking event on Wednesday 1 May at Loughborough University.

We will invite students and researchers from the Universities in our area to come along and showcase their research and/or projects in topics relevant to Operational Research and Analytics. They will be required to display their work on a poster and be available to answer any questions by attendees. The attendees (both academic and practitioners) will have a chance to see the wealth of Operational Research and Analytics techniques that are being used in our region.

As an incentive we will be offering prizes for the best poster and runner up. However for the individuals the real benefits are expected to come from the chance to mix with peers and find out about new opportunities to use O.R. skills. We hope that this event will be beneficial for all attendees and that it will provide a forum

for exchange of knowledge and for networking in our region. For the OR Society this is an opportunity for us to talk to a new audience that may not realise we exist.

To make this successful we need researchers and students willing to produce a poster on their work. We have already written to a number of university departments and research groups in our region to gauge interest. The people we have contacted have either been people the committee know or via some desk top research of the university websites.

There is no charge for this event and it will be open to members and non-members of the OR Society from the East Midlands and other regions to attend. More details about the event will follow in the next issue of Inside O.R.

If you would like to know more about this event, please contact Antuela Anthi Tako, (A.Takou@lboro.ac.uk) or Gillian Groom (g.groom@soton.ac.uk).

<OR>

THE **OR** SOCIETY

The OR Society

O.R. Pro Bono Scheme Co-ordinator

An opportunity has arisen for an enthusiastic graduate to join the Operational Research Society's small headquarters team in Birmingham. The Society is seeking an enthusiastic, proactive individual to establish an exciting new initiative: O.R. Pro Bono. The post-holder will build on an existing pilot scheme in order to establish a sustainable, thriving programme of voluntary O.R. support to the third sector. This is a part time (60%) post.

Duties will include: building relationships with potential partners, identifying potential users of the service and volunteers, matching volunteers to projects, monitoring projects, developing marketing materials and promoting the service, developing a sustainable business model and standard processes.

Initially, the post is for a fixed term of one year, but if the appointee successfully develops the role and if funding is obtained, it is possible that consideration will be given to its extension.

Salary will be in the range £22,000 - £25,000 (pro rata) depending on experience.

Applications should consist of a CV **not exceeding two pages**, together with a covering letter of **not more than one page**, which should explain the reason for your interest and the qualities you feel make you an ideal candidate. They should be submitted **by email only**, to gavin.blackett@theorsociety.com.

The closing date is **Thursday 28th March 2013**

www.TheORSociety.com
www.LearnAboutOR.com

OBITUARY - ANNE SHAND

NIGEL CUMMINGS

Anne Shand, who died aged 78, was a gifted mathematician and Operational Researcher who specialised in the analysis of the effectiveness of Britain's Independent Nuclear Deterrent force and made a name for herself in the Cold War era, a time when such fields were largely the preserve of men.

She began her career in 1955 as a scientific officer at the Ordnance Board, a time when the Ferranti Mark 1 Star was probably the only computer up to the task of dealing with the complex calculations scientists sought in their search solutions relating to problems posed by the British nuclear deterrent.

> 'I never wanted a woman in my team, but all the men were so awful that I couldn't help taking her on.'

Two years later she joined the Air Ministry as a Scientific Adviser and from 1960 to 1964 her work there was devoted to the RAF's V-Bomber force. Her duties included an assessment of the likely infrastructure damage and casualty rates in target areas and also survivability for the aircraft dropping the bombs.

Being a 'mere woman', she was not always made to feel welcome at the Air Ministry. On her appointment there, her immediate boss remarked: 'I never wanted a woman in my team, but all the men were so awful that I couldn't help taking her on.' Instead of being daunted by such a statement, Anne Shand found it both amusing and, more importantly, a challenge.

After the Wilson government's defence cuts in the mid-1960s, Britain's nuclear deterrent passed to the Royal Navy, and Anne Shand was promoted to principal scientific officer. In 1966 she became the Command Research Officer at the RAF's Air Support Command at Upavon in Wiltshire.

At Upavon, Anne Shand presided over a team of scientists and military personnel and was heavily involved in studies and assessments of 'dispersed air operations' following the introduction into RAF service in 1969 of the revolutionary Harrier 'jump jet'. She also studied the new technical capabilities of the Harrier and their potential for other combat aircraft in the early stages of their design.

She remained with the MoD until 1973, when she took a naval appointment in Bath. This gave her a chance to showcase her experience in O.R. and knowledge of ballistic missiles and qualify for a job in the Polaris Group, where she was involved with analysis that led to the development of the Chevaline warhead and the eventual move to the Trident system.

In 1983 Anne Shand continued her work in the world of nuclear deterrence in Whitehall, taking up a post at senior principal scientific officer level to analyse the targeting, delivery accuracy, defence penetration and weapons effects of the Polaris and Trident missiles. She returned to Bath in 1988 to work on the joint US/UK programme of Trident before retiring in 1991, when she was awarded the Imperial Service Order.

She was born Anne Marjorie Jane Stuart in Rawalpindi on February 24 1934, the daughter of Brigadier Reginald Stuart. She attended North Foreland Lodge School, near Basingstoke and graduated in Mathematics from St Anne's College, Oxford in 1955. She married Capt. Colin Shand RN, in 1966, inheriting four stepchildren. He died in 1992.

Anne Shand, born February 24 1934, died December 15 2012.

<OR>

THE PECULIAR MATHEMATICS OF DOMINO CHAIN REACTIONS

NIGEL CUMMINGS

We have all seen how a toppling domino like object can push over a larger domino or domino like object, but have you ever thought how much bigger can the next one be?

J M J van Leeuwen, a mathematician at Leiden University in The Netherlands, thinks he has worked out the secret behind domino chain reactions. Usually when one sees dominoes toppling, the dominos are all the same size but a toppling domino actually has enough momentum to push over a bigger one. So it is possible to set up a row of successively larger dominos that can be toppled by the push of a tiny domino at the beginning–a domino chain reaction. In other words can one amplify the toppling force and if so, what is the maximum growth factor – what is the largest domino that can be knocked over by one of a certain size.

Basically, a domino when stood on end has a certain amount of potential energy – its centre of gravity is ½h above the base (where h is the length of the longest side). This can be converted to kinetic energy by pushing the top of the domino until the CoG is just past vertically above the bottom right-hand edge. The domino should then continue to rotate about the pivot (bottom right-hand edge) gaining velocity (i.e. accelerating) until it hits the second [larger] domino. If the work (useful energy) is sufficient to rotate the second domino until its CoG is just beyond vertically above its pivot point then it will continue to rotate [fall] otherwise it will return to the vertical. Some energy will be lost if the coefficient of restitution is less than 1 (which it will inevitably be). Some will also be lost if the

coefficient of friction between the domino and the surface is less than infinity (the domino will simply slide to the right if it is too low). Very small amounts of energy will also be lost as noise at the point of impact and as heat as the smaller domino slides over the larger.

If the distance between the two dominos is too small, insufficient potential energy will have been converted to kinetic energy. If it is too large then the smaller domino will be more likely to slide to the left or, of course, miss the second domino completely.

Given perfect conditions, he was able to demonstrate that with optimal spacing, each succeeding domino can be no more than about twice as big as the previous one, which is a maximum growth factor of no more than about 2. That figure is significantly more than has been assumed in the past.

However, van Leeuwen admits that achieving this limit is probably unrealistic in practice because the assumptions can never hold perfectly. For example, dominoes will always slip by a small amount. Nevertheless, even a growth factor of 1.5 leads to some extraordinary chain reactions. A series of 13 dominoes that grow at this rate will amplify the force needed to push the smallest by a factor of nearly 200. If the thickness of the first domino is ¼' (6mm), its width 1' and its height 2' then the height of the 26th 'domino' will be more than one mile.

<OR>

‘Usually when one sees dominoes toppling, the dominos are all the same size but a toppling domino actually has enough momentum to push over a bigger on’

: : : : : : EVENTS WORLDWIDE : :

January – March 2013

ASTEC'2013 4th Annual Asian Simulation Technology Conference 2013
7-9 March 2013,Shanghai, China P.R. www.eurosis.org

GAMEON-ASIA'2013 5th annual Asian GAME-ON Conference
7-9 March 2013, Shanghai, China www.eurosis.org

EMO 2013 - the 7th International Conference on Evolutionary Multi-Criterion Optimization
19-22 March, 2013, Sheffield, UK, www.shef.ac.uk/emo2013

IMCIC2013 - 4th International Multi-Conference on Complexity, Informatics and Cybernetics
19-22 March 2013 Orlando, Florida, USA http://www.2013iiisconferences.org/imcic,

KGCM2013 The 7th International Conference on Knowledge Generation, communication, and Management 19-22
March 2013, Orlando, Florida, USA www.2013iiisconferences.org/kgcm

7TH IMA Quantitative Modelling in the management of health and Social Care Conference
25-27 March 2013, London, UK http://www.ima.org.uk/conferences/health2013.cfm

April – June 2013

EVO2013, 16th European Conference EuroGP, EvoCOP, EvoBIO, EvoMUSART and EvoApplications
3-5 April 2013, Vienna, Austria www.evostar.org

YOR18, Young OR18 Bi-annual Conference for O.R careers of less than 10 years
9-11 April 2013, University of Exeter, UK http://www.theorsociety.com/Pages/Conferences/YOR18/YOR18.aspx

FUBUTEC'2013 9th Annual Future Business Technology Conference 2013
15– 17 April 2013, Lincoln, , UK http://www.eurosis.org/cms/?q=node/2281

ICMSAO'13 5th International Conference on Modeling, Simulation and Applied Optimization
28-30 April 2013, Hammamet, Tunisia   www.icmsao.org

ISORAP 2013 International Symposium on Operational Research and its Applications
8-10 May 2013, Marrakech, Morocco http://isorap.uiz.ac.ma/

ISCRAM2013: The 10th International Conference on Information Systems for Crisis Response and Management
12-15 May 2013, Baden-Baden, Germany   http://iscram2013.org

IIE 62nd Annual Conference & Expo
18-22 May 2013 San Juan, Puerto Rico http://www.iienet2.org/annual2/

ISC'2013 11th Annual Industrial Simulation Conference 2013
22-24 May 2013, Ghent, Belgium http://www.eurosis.org/cms/?q=taxonomy/term/334

CIAC 2013 8th International Conference on Algorithms and Complexity
22-24 May 2013 Barcelona, Spain http://albcom.lsi.upc.edu/ciac2013

CORS 2013 The 55th CORS Annual Conference
27-29 May 2013, Vancouver, BC, Canada http://cors.forestry.ubc.ca

KIM2013 Knowledge and Information Management conference
4-5 June 2013 Meriden, UK www.theorsociety.com//KIM2013/aspx

CEIT 13 International Conference on Control, Engineering & Information Technology
4–7 June 2013, Sousse – Tunisia : http://ipco-co.com/Invited-Sessions.html

MathSport 2013 – The 4th International Conference on Mathematics and Sport
5-7 June 2013 Leuven, Belgium http://www.mathsportinternational.com

SEA2013 12th International Symposium on Experimental Algorithms
5-7 June 2013, Rome Italy http://sea2013.dis.uniroma1.it

ICAPS'13 The 23rd International Conference on Automated Planning and Scheduling
10-14 June 2013 Rome, Italy http://icaps-conference.org

MCDM2013 22nd International Conference on Multiple Criteria Decision Making
17-21 June 2013 Málaga, Spain http://www.mcdm2013.decytec.ccee.uma.es/index.php

: : EVENTS WORLDWIDE : : : : : :

NUMTA2013: Numerical Computations: Theory and Algorithms International conference
17–23 June 2013 Falerna, Italy http://wwwinfo.deis.unical.it/~yaro/numta2013

MIM 2013 IFAC Conference on Manufacturing Modelling, Management and Control
19-21 June 2013 Saint Petersburg, Russia http://www.mim2013.org/

DEA2013 11th International Conference on Data Envelopment Analysis
27-30 June 2013 Samsun, Turkey http://DEAsociety.org/dea2013

11th EUROPT Workshop on Advances in Continuous Optimization
26-28 June 2013 Florence, Italy www.europt2013.org

CCISE 2013 International Conference on Complexity, Cybernetics, and Informing Science and Engineering
30 June-6 July 2013 Porto, Portugal www.2013iiisconferences.org/ccise

AISE 2013 The Special Track on Academic Informing Science and Engineering
30 June-6 July 2013 Porto, Portugal www.2013iiisconferences.org/aise

July – September 2013

Euro XXVI and INFORMS Joint Conference
1-4 July 2013 Rome, Italy http://euro2013.org/

IMSIO 5 2013 The 5th European Conference on intelligent Management Systems in Operations
3–4 July 2013, University of Salford, UK email s.vadera@salford.ac.uk

GECCO 2013 GENETIC AND EVOLUTIONARY COMPUTATION CONFERENCE
6-10 July 2013, Amsterdam, The Netherlands http://www.sigevo.org/gecco-2013

VeRoLog 2013 EURO Working Group on Vehicle Routing and Logistics Optimization
7-10 July 2013 Southampton, UK https://www.ocs.soton.ac.uk/index.php/verolog/verolog2013

ORAHS 2013 39th ORAHS 2013 Conference
7-12 July 2013 Istanbul, Turkey, http://orahs2013.org

EISTA 2013 The 11th International Conference on Education and Information Systems, Technologies and Applications
9-12 July 2013 Orlando, Florida, USA www.2013iiisconferences.org/eista

IMSCI 2013 The 7th International Multi-Conference on Society, Cybernetics and Informatics
9-12 July 2013 Orlando, Florida, USA www.2013iiisconferences.org/imsci

IMETI2013 The 6th International Multi-Conference on Engineering and Technological Innovation
9-12 July 2013, Orlando, Florida, USA www.2013iiisconferences.org/imeti

WMSCI 2013 The 17th World Multi-Conference on Systemics, Cybernetics and Informatics
9-12 July 2013 Orlando, Florida, USA www.2013iiisconferences.org/wmsci

DeMset 2013 Design and Modeling in Science, Education, and Technology
9-12 July 2013 Orlando, Florida, USA www.2013iiisconferences.org/demset

QRMSE 2013 Qualitative Research and Methodologies in Science and Engineering
9-12 July 2013 Orlando, Florida, USA www.2013iiisconferences.org/qrmse

30 ISMOR 30th International Symposium Military Operational Research
29 July -2 August 2013, Royal Holloway, University of London, UK www.ismor.com

MISTA 2013 Special Track on EDUCATIONAL TIMETABLING
27-30 August 2013, Gent, Belgium http://www.schedulingconference.org/

NICSO 2013 International Workshop on Nature Inspired Cooperative Strategies for Optimization
2-4 September 2013 Canterbury, United Kingdom http://www.nicso2013.org

OR55 Operational Research Annual Conference
3-5 September 2013 Exeter, Uk http://www.theorsociety.com/pages/conferences/conferences.aspx

International Conference on Operations Research
3-6 September 2013, Rotterdam, The Netherlands, www.or2013.org

EPIA 2013 Artificial Life and Evolutionary Algorithms
9-13 September 2013, Azores - Portugal http://www.epia2013.uac.pt/

REGIONAL SOCIETIES

EAST MIDLANDS (EMORG)

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EMORG - Sports Analytics Sports Analytics at Leicester Tigers

Date/Time: Tuesday 12th March 2013 at 6pm

Venue: Room BE1.42, Business School, Loughborough University

Speaker: Andy Shelton, Head of Sports Science at Leicester Tigers

Abstract: 'There is tremendous value to be gained by retaining experienced players within the squad and we are confident that, by adopting predictive analytics, our team will be able to leverage data about the physical condition of players for the first time and considerably enhance our performance.'

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SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.

TEL: 029 2087 5524 Fax: 029 2087 4199

EMAIL: ThompsonJMI@cardiff.ac.uk
SWORDS - OR in sport: some examples
Date/Time: Tuesday, 26 February 2013 at 17.45
Venue: Mathematics Institute, Cardiff University. Tea and coffee will be available from 5.30pm in the Internet Café which is just inside the main entrance to the Mathematics building. The talk will commence at **5.45pm** in room **M/0.40** (ground floor).
Speaker: Phil Scarf
Tea and coffee will be available from 5.30pm in the Internet Café which is just inside the main entrance to the Mathematics building. The talk will commence at **5.45pm** in room **M/0.40** (ground floor). For further information contact Jonathan Thompson Tel: 029-20875524

Abstract
This talk considers how modelling can be used to shed light on a variety of sporting problems. We look at:
1. How the timing of a declaration in the third innings in test match cricket can be 'optimized'.
2. Route choice in mountain running events and an empirical basis for Naismith's rule.
3. Rating football players based upon actions that contribute to the final result of the game.
4. How we might rank players in test cricket putting batting and bowling contributions on the same scale.
5. Optimum strategy in match sprint track cycling.
6. Tournament design.

Phil Scarf is a professor at the University of Salford. His research interests are in Replacement Modelling, Reliability and Maintenance Modelling, and O.R. and Statistics in Sport. He is currently co-editor of the IMA Journal of Management Mathematics which recently published a special issue on O.R. in Sport under his editorship. He has competed in a variety of sports: rugby, cricket, rowing, orienteering, cycling. His current hobby is expedition racing.
Dates for your Diary
Tuesday 5th March 5.30 5.30pm, Cardiff University – Steve Black and Jon Cook (PA Consulting). Applications of OR within health and the pharmaceutical sector.

WESTERN (WORDS)
CONTACT: Dr Jo Smedley
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YORKSHIRE & HUMBERSIDE (YHORG)
CONTACT: Stuart Johns.
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YHORG : The NHS Commissioning Board
Date/Time: Thursday **25 April 2013 6-8pm refreshments from 5.30pm**
Venue: West Yorkshire Playhouse Priestley room
Speaker: Various see below

Abstract: The NHS Commissioning Board (NHS CB) will take up its full statutory duties and responsibilities on 1 April 2013 with a key role in delivering a modernised health service and securing the best possible health outcomes for patients. It will do this by putting patients and the public at the heart of everything we and empower and support clinical leaders.

Stephen Lorrimer - Operational Research Head of Profession
The Department of Health has a long standing O.R. community. This talk will discuss how we expect to O.R. to have continuing impact in the future through DH and it's new Arm's Length Bodies, such as the NHS Commissioning Board.

David Gilding - Head of Public Health Intelligence at Nottinghamshire County
Following his successful talk at the East Midlands O.R. Group, David has agreed to speak at the Y&H OR Group meeting

With over £8 billion spent on the NHS in the East Midlands each year the processes to decide the best way to spend this money would seem to be fertile ground for O.R., yet the application of formal modelling, simulation and other O.R. techniques in local NHS commissioning is extremely rare. In this talk, David describes recent projects in which NHS Nottinghamshire County has started to use O.R.methods and reflects on the added value that has resulted.

If members want to attend, can they email me at jamescrosbie@hotmail.co.uk

<OR>

SPECIAL INTEREST GROUPS

COMMUNITY OR NETWORK
CONTACT Leroy White
EMAIL: leroy.white@bristol.ac.uk
TEL: 0117 954 5683

COMPLEX SYSTEMS DISCUSSION GROUP
CONTACT: Kevin Gilligan
TEL: 0208 977 8553
EMAIL: GilliganMauve@geo2.Poptel.org.uk
Group meetings to be held at 12 Noon
Last Friday of the month
The Adelaide, Park Road, Teddington
Meeting Title : The Management of Uncertainty

CRIMINAL JUSTICE
CONTACT: Ian Newsome
TEL. DDI: 01924 292244 **Extension:** 22244
EMAIL: ian.newsome@westyorkshire.pnn.police.uk

Criminal Justice Special Interest Group Meeting
Date/Time: Monday, 04 March 2013 10.30am – 3.30pm
Venue: W. Yorks Police, Wakefield
Speaker: Various see below.

Our next event will be held on March 4th at West Yorkshire Police HQ in Wakefield, close to the mainline station, from around 11am - 3.30pm. The theme is mainly around continuous improvement in the public sector. Speakers include Amanda Gregory from Hull University (who is Research Champion of the Institute for Continuous Improvement in the Public Sector) & Chief Inspector Steve Precious from the National College of Policing (newly formed from the NPIA) on 'Systems approaches for continuous improvement'; Prof Duncan Shaw from Warwick University on 'Emergency planning'; Daniel Livingstone, Economics Adviser to the Home Office on 'Economies of scale in police air operations' ; an MoJ speaker on 'Measuring criminal court efficiency using DEA', and David Fitzgerald, Donna Tranter and Martin Rahman from W Yorks Police on 'Bringing O.R. to the Frontline'.

Programme
10.30	Arrive and coffee/tea
11.00	Introduction and welcome, Ian Newsome, Chair CJ sig.
11.05	'Systems Approaches for Continuous Improvement', Amanda Gregory, Hull University and Research Champion of the Institute for Continuous Improvement in the Public Sector, & CI Steve Precious from the National Policing College.
12.05	'Measuring criminal court efficiency using DEA', MoJ

speaker (to be announced).

12.35-1.15	Lunch break and networking (NB please bring your own sandwiches; water,tea,coffee will be provided).
1.15 -2.15	'Economies of scale in police air operations', Daniel Livingstone, Economics Advisor, Home Office.
2.15	'O.R. in emergency planning', Prof.Duncan Shaw, Warwick University.
2.45	'Bringing O.R. to the Frontline', David Fitzgerald, Donna Tranter and Martin Rahman from West Yorks Police .
3.30	end

Please notify Sue Merchant as soon as possible if you would like to attend as space is likely to be limited. suemerchant@hotmail.com

DECISION ANALYSIS

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DEFENCE

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Chief Scientist
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EMAIL: arobinson@dstl.gov.uk
Defence Special Interest Group
Date/Time: Wednesday 10 April 2013, 1000 – 1600
Venue: Park Centre, Farnborough Aerospace Centre, Farnborough, Hants
Speaker: Jonathan Batson, IBM; Tom McCutcheon Dstl
Our next event will be a full day workshop with a limited group of selected participants. The theme is the role of Analytics in Defence Analysis. The aim of the debate is to identify what more the defence analysis community should be doing.to fully exploit the opportunities (if any) provided by the different categories of analytics: Descriptive, Predictive, Prescriptive. A full agenda for the day will be issued closer to the day, but will include a number of syndicate sessions to discuss specific aspects of the issue. These sessions will be fuelled by the information provided by the speakers in their opening keynote remarks.

Spaces are strictly limited: if you would like to attend please contact Noel Corrigan by Mar 27th. (noel.corrigan@corda.co.uk)

FINANCIAL SERVICES

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Quantitative Modelling in the Management of Health and Social Care Conference
Date/Time: Monday 25 March 2013
Speakers: See below
Venue: Woburn House Conference Centre, London

Abstract: Health and Social Care systems are facing major challenges worldwide, due in part to changes in demography and advances in technology and in part to changes in the structure and organisation of the system whether they are hospitals, general practitioners or long-term care settings. Yet running health and social care systems efficiently and effectively is crucial to improving or even maintaining our quality of life. Over the years, extensive research has been conducted to find immediate and long-term solutions to issues that are routinely faced by health and social care professionals, such as waiting lists and bed capacity, hospital redesign, workforce planning and scheduling, patient flow, performance management, disease monitoring, and health care technology assessment. Mathematical modelling and computer simulation techniques (statistical analysis, stochastic processes, queuing theory, mathematical programming, heuristics, discrete event simulation, system dynamics, etc) have shown to be increasingly valuable in providing useful information to aid planning and management. The aim of the conference is to bring together health care managers, clinicians, management consultants, and mathematicians, operational researchers, statisticians, health economists, computer scientists etc from across the world with a view to bridging the gap between the respective communities and to exploring recent developments and identifying fruitful avenues for further research.

Confirmed Invited Speakers
Professor Stephen E. Chick, Professor of Technology and Operations Management, Novartis Chair of Healthcare Management, INSEAD, France; Professor Malcolm Grant, CBE, UCL Provost and President and Chair of the NHS Commissioning Board; Dr David Paynton, FRCGP, DMS, MBE, Practicing GP, Clinical lead for Out of Hospital care at Southampton City Clinical Commissioning Group and National Clinical Lead for the Royal College of General Practitioner's Centre for Commissioning; Dr Geoffrey Royston, President of the Operational Research Society and former Head of Strategic Analysis and Operational Research in the Department of Health for England, and Professor Peter Smith, Professor of Policy and co-Director of Centre for Health Policy, Imperial College London.

We invite researchers in all relevant problem domains and methodologies to submit abstracts of 300 words by Friday 14th December 2012 by e-mail to conferences@ima.org.uk.
For more information visit
www.healthcareanalytics.co.uk/conferences/imahealth2013/

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THIRD SECTOR O.R.
CONTACT: Katherine Byrne
EMAIL: katherine.byrne@voa.gsi.gov.uk
Third Sector OR Committee
Date/Time: 27th March 2013, 4 - 6pm
Venue: London School of Economics
Speaker: Various See below

The next Third Sector special interest group meeting will focus on Third Sector O.R. in developing countries. We will be exploring how O.R. analysts can contribute to this distinct part of the Third Sector, via O.R. work done either from the UK or on-site in developing countries. Andrew Dobson will explore the role of O.R. analysts and Anthony Harries will talk about building O.R. capacity in low and middle income countries. We will also hear case studies from Ivor Langley, Honora Smith and Paul Randall, covering O.R. methods ranging from optimisation to evaluation and applications in the health sector and non-governmental organisations.

- Third Sector O.R. and developing countries: Some possibilities: **Andrew Dobson**
- Evaluation of Tuberculosis diagnostics in Tanzania: **Ivor Langley, Liverpool School of Tropical Medicine**
- Locating laboratories for HIV/AIDS testing in South Africa: **Honora Smith, University of Southampton**
- Working with NGOs in Namibia: **Paul Randall**
- Capacity building for operational research in low and middle income countries: **Anthony Harries, International Union Against Tuberculosis and Lung Disease**

Entry to this event is free but advance registration is essential. To book your place for this meeting, please email Katherine.Byrne@voa.gsi.gov.uk by 20th March

<OR>

OR-30

John Crocker
March 1983

Verification and validation of complex simulation models is never going to be simple. Indeed, it has been postulated that it is impossible to validate a simulation model, although, of course, that does not stop QA people from insisting on proof that a model has been properly validated. In a paper written by A.J. Taylor, Reckitt & Colman PLC (as was) (whom, at the risk of upsetting half the population, I shall assume is male) describes how 'loop analysis' can be used to verify such models. His model is of the supply and demand of shipping tonnage involving both dry cargo vessels and tankers operating in a free market environment. He has produced some impressive diagrams which breakdown ultimately to eleven feedback loops for each of the two types of cargo/vessel. He has recognised that each loop has five characteristics (as defined by Coyle) which are: polarity, gain, delay, pure integration and linearity. He then checks that the loops in the model behave in the same way in each of these characteristics as would be expected. Although this does not guarantee the model has been coded correctly, it does at least indicate that its behaviour is internally consistent.

Two authors (Daniel and Dare) from the RAF and MOD provide an interesting insight into the dilemmas facing Government departments in general and O.R. groups in particular using a defence procurement programme as an example. Unlike Industry and Commerce, these departments are generally expected to provide a service for which there is no market price. They use a relatively simple example in which they start with four squadrons of aircraft (60 in total) all to Mk 1 standard that can be ungraded to Mk 2 or to Mk 3 either by direct replacement or via a retrofit. Assuming a Mk1 has an effectiveness of 1.0, Mk 2s are 1.1 and Mk

3s 1.4 times as effective. All the relevant costs and timescales are 'known'. The simple question is how many of each mark should be bought and how many of the earlier marks should be upgraded via retrofits over a 10-year period during which it is assumed that a minimum of 12 aircraft will have to be replaced. The solution they have derived is based on trying to maximise the average effectiveness of the operational squadrons while keeping within annual budgetary limits. To achieve this, the normal reserve of 12 aircraft was cut to zero in three of the ten years and in one year a flight of four aircraft had to be laid-up to save on operating costs. They point out that this solution was based on certain simplifying assumptions and may not be the absolute 'best' solution – whatever that means.

If you have not had any experience of dealing with Government contracts, I thoroughly recommend reading this latter paper as an introduction to the difficulties that arise when maximising profit or return on investment is not the overriding factor. Again, may I apologise to the authors of the other six papers that I have not mentioned through no fault of theirs.

Daniel, D.W., and D.P. Dare, (1983), Cost and Utility: Where does the Balance lie for Governments? , *JORS* **34**.3, Pp 193-200, (jors198347a.pdf)

Taylor, A.J., (1983), The Verification of Dynamic Simulation Models, *JORS* **34**.3, Pp 233-242, (jors198351a.pdf)

Coyle, R.G. (1977), *Management Systems Dynamics*, Wiley, New York

<OR>

OR-20 Extracted from OR Newsletter March 1993

NEWS

O.R. Beats windsurfing hands down

Results of our Christmas Core Message competition

To the sceptics who maintain that there's only one person who ever reads O.R. Newsletter, we can now retort that our Core Message Competition generated quite a postbag. To the judges, just back at their desks after a Christmas break in which they had contributed significantly to the trade deficit in mince pies, that was a mixed blessing.

The brief

The brief required that entries should be short and neat – no more than ten words and preferably no more than six, and with a clever edge to make them more memorable.

In the event, nearly all the entries proved to be short enough. The most popular devices for meeting neatness criterion were puns, alliteration and use the initials O and R.

In the punning category there was

O.R. people do it with models.

If nothing else, that should generate a boom in applications from

windsurfers for places on O.R. Courses. But whilst it would be great for T-shirts and car stickers, we could hardly put it on our headed paper, now could we?

Alliterative entries varied from the short and snappy

Analysis into action,

To the tour de force

Making the most of manpower, machines, materials, money and minutes.

Mmmmmmmmm

As the Society strives personfully to be non-sexist, we were disappointed that no-one submitted a feminist version to counterbalance the above, but began to understand why, when the best we could do turned out to be

Waxing with womanpower, widgets and wons,

Which is hardly likely to catch on, even in Korea which, according to our Guinness Book of Answers, appears to be the only country to have a unit of currency – the won – beginning with 'w'. (You learn something new, and in this case useless, every day, don't you?)

Using the letters O and R we had examples such as

ORder from disorder

and

O.R. for the Optimum Result.

There were a number of other entries that were nice, but which didn't fall into any of the above categories. These included the thoughtful

Analysis in support of judgement

and

O.R. subtracts problem difficulties, multiplies management effectiveness, divides costs, adds benefits,

Which is neat but not short in terms of the rules of the completion.

The winner

And so to the difficult part, the choice of a winner. The judges felt that, whist none of the entries were good enough to be adopted by the Society as an official core message (it is difficult, isn't it?) there were several that were good enough to be worthy of the prize. Unfortunately, none of these shortlisted entries stood out as clearly the best of the bunch, and so the time honoured method of resolving ties was adopted. First out of the hat was

Developing thoughtful answers to management questions

Which was submitted by Sue Merchant of Rickmansworth, who will be receiving our congratulations and prize shortly. Out thanks to all those who took the time and trouble to dream up an entry. We hope you had as much fun doing that as we did in reading them.

The judges were Paul Thornton and Bob Miles

<OR>

PROSPECT
RECRUITMENT

OR CONSULTANCY – HEALTH SECTOR
£35,000 - £60,000 Package

Our client's OR consultancy team seeks additional consultants offering proven experience in health, social care or big pharma environments, underpinned by genuine self confidence, drive and a minimum 2i Hons academic track record, ideally supported by an MSc. With engagements embracing a wide range of activities, you can expect full commitment to training and career development potential, geared entirely to individual achievement. **Central London based**

SUPPLY CHAIN MODELLING
£30,000 - c£40,000 + Benefits

Enviable opportunity to join the Consulting Services team of this leading logistics company, undertaking projects for major UK and international companies and thereby gaining broad experience of different market sectors, with significant business exposure. A demonstrable track record of success to date should include experience/understanding of simulation or excel modelling, supported by intellect, tenacity, confidence and team working skills. **M23 Corridor – Surrey/Berks/Hants**

BUSINESS MODELLER
To c£50,000 + Bonus

Our client leads the field in the fast growing market for strategy-level simulation solutions. Business modelling, particularly system dynamics expertise, is viewed as pivotal to their work, prompting their current need to recruit an accomplished modelling professional. A natural problem-solver with proven analytical and conceptualising abilities, underpinned by academic excellence, you can expect a challenging brief with future advancement limited only by talent. **Surrey**

ACTUARIAL STATISTICIAN
£47,000 - £60,000

Exciting opportunity to join this established, well-respected team, comprising research scientists, analysts and actuaries. The key deliverable of this new role is to develop longevity and mortality statistical models to support pricing and financial decision making. Successful candidates are likely to have a statistics or actuarial qualification, underpinned by proven Excel modelling skills, and able to add real commercial value from analysing large datasets. **Surrey**

SAFETY RISK MODELLER
£40,000 - £50,000 + Bonus/Benefits

This new role has been created within our well respected consultancy client, who specialise in providing hazard, safety performance and risk assessment capabilities to the travel industry, through quantitative analytics and modelling expertise. A good numerate degree, excellent problem solving skills, well developed communication capabilities and the ability to apply these to assess real life, are the key requirements for this enviable opportunity. **London - City**

TRANSACTION ANALYTICS - COGNOS
£35,000 - £50,000

Our dynamic leisure industry client has created a new quantitative role, focused on achieving revenue optimisation through innovative analysis and business insight of customer transactions. With a brief to extract, manipulate and model activity data to create robust intelligence and translate this into accurate business drivers, you will need a combination of technical and interpersonal excellence, including proven experience of Cognos. **London or Manchester**

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

SOLUTIONS DESIGN CONSULTANT-3PL
£Excellent

An accomplished 'analytical consulting' professional is sought with a min 4 years experience able to offer a blend of numerate/analytical expertise, well honed consulting skills and a sound appreciation of logistics, preferably from within a retail environment. Ideally having come from an operational research, business modelling or similar quantitative problem solving background, the successful applicant will have a good numerate degree, an understanding of 3rd party logistics, consultant practitioner skills and the ability to develop credibility in End to End supply chain processes. **Oxfordshire**

ANALYST/MODELLER
To £30,000

This expanding and innovative firm are currently seeking to grow their successful Bid Team and as such are seeking to recruit additional analytical resource at either fresh graduate level or those with up to 2 years experience. The role will encompass processing and analysing data, assisting in the production of revenue and demand models and risk analysis to support the submission of winning bids in the public transport sector. **London**

MARKETING ANALYSTS
£Excellent + Benefits

This rapidly expanding Marketing Analysis Consultancy are seeking high calibre Customer/ Marketing Analysts with proven experience of conducting and delivering data analysis (reporting, profiling, segmentation) using SAS. The successful candidates should have a numerate degree, strong SAS and SQL skills and have the ability to add value from day one. Excellent client facing skills are an essential pre-requisite, as is a real passion for gaining insight from data. **London**

HEAD OF MARKET PRICING–PERS LINES INS
Negotiable To c£100,000 DOE

Outstanding new opportunity to join this innovative and successful Personal Lines Insurance Company and lead a new Market Pricing Team ensuring quoted prices are optimal considering volume vs profit appetite, risk and operational costs, customer purchasing behaviour and competitor pricing. High calibre candidates are likely to be qualified actuary, have strong knowledge of price optimisation techniques and have a good understanding of personal lines insurance products. **Surrey**

ECONOMETRICS INSIGHT CONSULTANCY
£30,000 - £80,000 Negotiable DOE

One of the world's leading research and insight consultancies measuring the effectiveness of marketing related activities are in a strong position to extend their client offerings and capabilities beyond their econometric roots. As a result, they are looking to develop their team with opportunities available from Analyst to Associate Partner. Applicants will need to offer a balance of sound technical and analytical tools, demonstrable problems solving skills and a genuine understanding of commercial imperatives. **SE London**

SIMULATION CONSULTANT
To c£35,000 DOE + Benefits

Leading UK based software and consulting company, specialising in business performance improvement solutions seeks to recruit a 'business aware' Consultant. Projects include delivering discrete event simulation and production scheduling solutions for customers in the UK, Europe and USA. A logical train of thought is required to synthesise client requirements and formulate cost effective solutions. You will be able to translate real systems into the terms that are typically used in a simulation modelling language. **Coventry**

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.

Telephone: 01892 510892   **Email: or@prospect-rec.co.uk**   **Web: www.prospect-rec.co.uk**