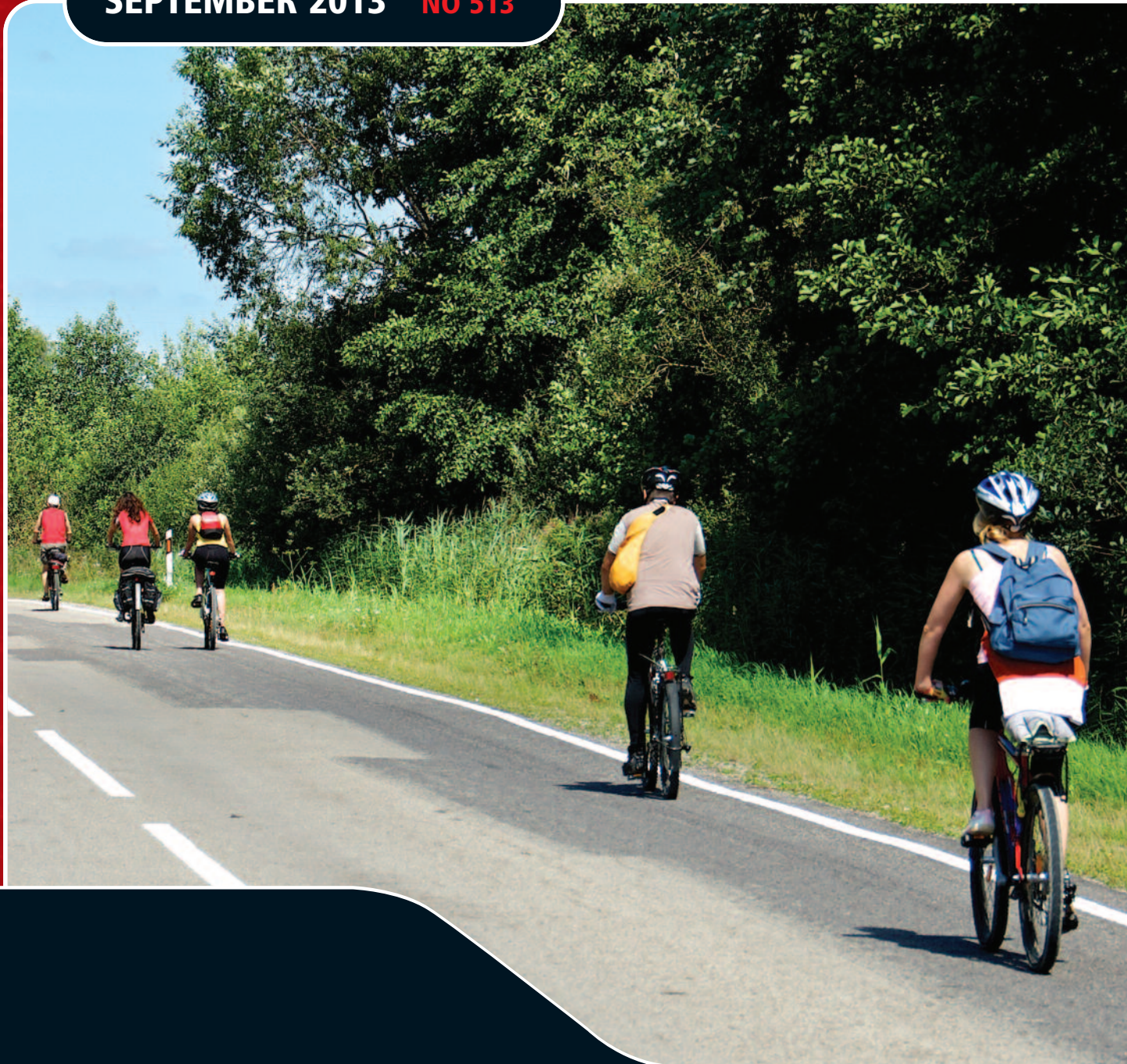


THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

SEPTEMBER 2013 NO 513



JAM TODAY!

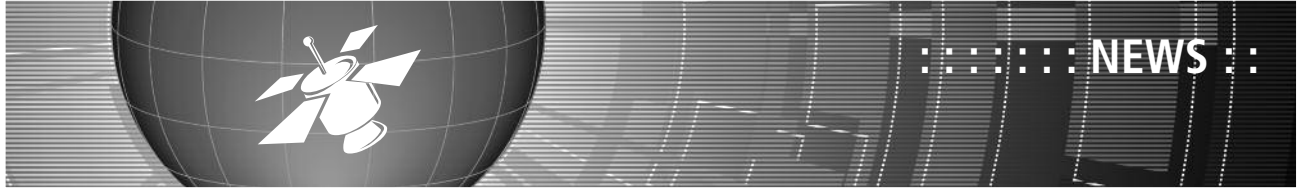
:: INSIDE THIS MONTH :: :: :: ::

PATIENT! HEAL THYSELF!
CAREERS OPEN DAY 2013
CRYSTAL BALLS AND SILVER BULLETS
WHERE THERE'S DATA, THERE'S BRASS!



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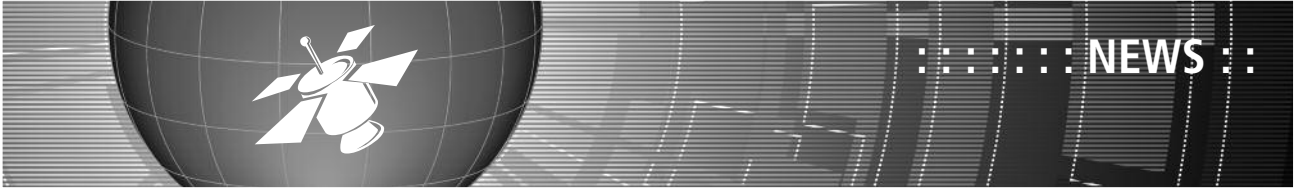
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PROFESSOR BARRY L. NELSON TO GIVE KEYNOTE SPEECH AT SW14

SW14, the biennial OR Society Simulation Workshop will, once again, be held at the splendid Abbey Hotel Golf and Country Club in Worcestershire on 1 and 2 April 2014. The Simulation Workshops bring together practitioners and academics working in the field of discrete-event simulation and related fields.



Professor Barry L. Nelson

SW14 will provide an opportunity to exchange ideas on the current and future state-of-the-art in simulation and modelling. The programme will consist of a keynote presentation by Prof Barry L. Nelson, Northwestern University, Evanston, Illinois USA, together with a panel discussion and parallel streams. Breaks between sessions and the conference dinner provide an excellent opportunity for networking. An exhibition area will include some of the latest developments in simulation software tools.

In his keynote speech, Professor Nelson will affirm that simulation is a powerful tool to design, evaluate and improve the kinds of systems and processes that concern operations researchers and management scientists. He says that far from its early role as the brute force method of last resort, simulation now supports decision making both routine and critical. The software, and knowledge about how to use it, are widespread. But simulation frequently involves a large commitment of time, effort and money, and users often do not get everything they paid for; even worse, the results they do get may be seriously misleading. This talk describes common ways that good simulations go bad and how to avoid (or at least recognise) them. Lots of examples will be provided to support the technical points.

Details of the programme, key deadlines, facility for giving a paper, fees and committee structure can be found at www.theorsociety.com – follow the links to SW14



Professor Nelson's keynote speech is entitled 'Why Good Simulations Go Bad'. Barry Nelson is the Walter P. Murphy Professor and Chair of the Department of Industrial Engineering and Management Sciences at Northwestern University. He received his BA in mathematics and computer science from DePauw University and his MS and PhD in industrial engineering from Purdue University. Before joining Northwestern in 1995 he was on the faculty at The Ohio State University.

Nelson's research is on the design and analysis of computer simulation experiments on models of discrete-event, stochastic systems, with applications to manufacturing, services, finance and transportation. He has published numerous papers and three books, including *Discrete-Event System Simulation, 5th edition* (2010), and *Foundations and Methods of Stochastic Simulation: A First Course* (2013). Nelson is a Fellow of INFORMS and IIE. In 2006 he received the Outstanding Simulation Publication Award from the INFORMS Simulation Society for his work on simulation optimisation, and in 2007 and 2010 he was awarded the Best Paper-Operations Award from IIE Transactions. He has also received the Northwestern University Alumni Association Excellence in Teaching Award, and has twice been named McCormick Teacher of the Year in engineering at Northwestern.

'Nelson's research is on the design and analysis of computer simulation experiments on models of discrete-event, stochastic systems, with applications to manufacturing, services, finance and transportation.'

2012 OR SOCIETY PHD PRIZE: CELEBRATING EXCELLENCE IN PHD RESEARCH

JO SMEDLEY, UNIVERSITY OF SOUTH WALES

Nominations for the 'Most Distinguished Body of Research leading to the Award of a Doctorate in the field of O.R.' is now open with the annual award being made at the OR Society's Blackett Lecture in November 2013.



The thesis being submitted for consideration must have been examined at a UK University in 2012. The qualifying period is the calendar year in which the PhD or DPhil is defended or approved. Further details are available on the OR Society webpages at <http://www.theorsociety.com/Pages/Awards/PHD.aspx>.

With a prize fund of up to £2500 plus conference places available for the winner and runners-up, this represents an exciting new development for PhD students. Initial nominations are normally from the external examiner who has identified the body of research as of exceptional quality.

The winner of the award wins a cash prize of £1500. Up to two runners-up each receive £500. The winner has their name engraved on the George Paterson shield as a permanent record of their achievement. The successful candidates are expected to present their work at the annual conference of the OR Society. A significant contribution towards to cost of the conference is available to all prize winners.

The deadline for receipt of submissions is **30th September**. All submissions should be sent to Gavin Blackett, OR Society Secretary & General Manager (gavin.blackett@theorsociety.com).

The winner and runners-up for this award will be announced during October.

Make that submission now!!

Previous Winners:

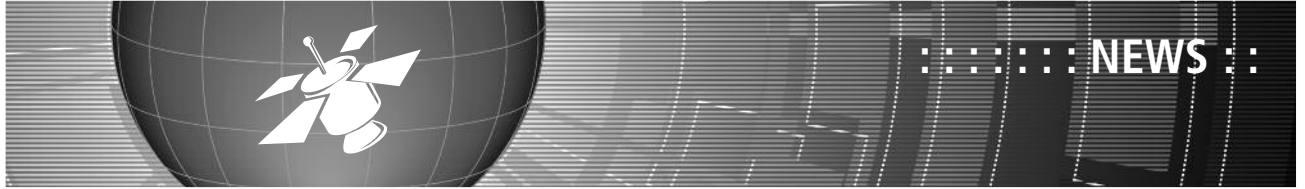
- **2011 Winner:** R. Wood, University of Cardiff.
Runners-up: S Allen, University of Nottingham; Dong Li, Lancaster University
- **2010 Winner:** F Liberatore, University of Kent.
Runners-up: Md Asaduzzaman, University of Westminster; G De Maere, University of Nottingham
- **2009 Winner:** A Strauss, Lancaster University.
Runners-up: S Adeyemi, University of Westminster; A Tako, University of Warwick
- **2008 Winner:** K Kaparis, Lancaster University.
Runner-up: D Arthur, University of Surrey



REGIONAL SOCIETIES

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

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



JAM TODAY!

NIGEL CUMMINGS

Recent research is looking at how closing roads during peak flow times can reduce congestion!



At current rates of increase in car sales, it will not be long before everyone is driving two cars to work every day! Despite more people working from home, congestion on our roads is still getting worse. The obvious answer would seem to be to build more roads but according to Dietrich Braess, a German mathematician, as far back as 1968, adding new roads can increase individuals' travelling times and increase congestion.

Essentially it is all to do with freedom of choice and behaving rationally. If the traffic flow is in a 'Nash equilibrium' state then the rational decision to take the shortest route will always be the best one. However, if the system is not in equilibrium drivers are likely to switch to the route which they think will minimise their travel times, even though it is longer in distance. Adding in extra roads can create a system that is no longer in equilibrium.

Equally, the converse may also be true – taking roads out of a system that is not in equilibrium may allow it to reach an equilibrium state. As a result planners are spending hundreds of thousands of pounds looking at how the closing of roads may be applied to effectively ease traffic congestion in our towns and cities.

Of course one solution which seems to have eluded those of us regularly affected by traffic congestion is the ability of bikes and even motorcycles to zip in and out of traffic quickly and easily. In

particular, and for short distances bikes offer an ideal means of getting to and from work or completing shopping errands, they are eco-friendly and healthy too, but we tend to forget this. The Belgians though are very aware of the value of two-wheeled transport.

Research by Belgian consultancy Transport & Mobility Leuven, has already proved that if just 10% of car journeys were changed to bikes the saving in time for all journeys would be 60% with a 6% drop in emissions. The research also implies that if 25% of car drivers changed to bikes or scooters, congestion could be completely eradicated.

As 80% of all UK commuter car journeys are single occupancy and on average no more than 8 miles there is obviously considerable sense in adopting 'two wheels good, four wheels bad' as the mantra for getting Britain moving.

If this article strikes a chord with you and you are thinking about using two rather than four wheels, you may be interested in 'having a go' on two wheels for free with the 'Get On' campaign. The campaign allows you to experience life on two wheels in a safe and secure environment with all the kit provided at locations around the country. For more information on this incentive go to: <http://www.geton.co.uk/>

CRASH COURSE TO BUILD YOUR O.R. TOOL KIT – PART II

Here's a good way to develop your skills in a wider range of O.R. techniques than the ones you use every day. The OR Society's five-day course 'Introduction to O.R. II' provides a thorough introduction to the process of O.R. and a wide range of the techniques available.



Frances O'Brien



Stewart Robinson

This very highly-regarded training programme, which has been designed by Frances O'Brien and Stewart Robinson, is a crash course in some fundamental O.R. techniques and, consequently, it's intensive and covers a great deal of material.

Although many delegates are relatively new to the field of O.R. the Introduction to O.R. course is also valuable to practitioners who specialise in a few techniques but would find some sound understanding of others helpful. Feedback from previous years suggests that the course provides a solid introduction to new techniques that the more experienced can add to their O.R. tool kits as well as offering a great starting point for relative a newcomer to the field.

It's not necessary to have attended 'Part I' to benefit from 'Part II' since both are stand-alone courses that cover different subjects. The topics covered in 'Introduction to O.R. II' include Problem Structuring Methods, System Dynamics, Statistical Methods in O.R.: multivariate models, Data Envelopment Analysis and O.R. in Strategy. On most days attendees get the chance to use recognised software for performing each technique.

Each day in the course covers a different set of topics and is led by an expert in the relevant field from one of the UK's top Business Schools. The days are generally a mixture in format between lectures from the demonstrator and more interactive problem-solving and group work.

On completing the course, you'll be able to identify the suitability of a technique for a problem situation and be able to apply those techniques. To make the educational experience personal, numbers attending are usually kept quite small so it's a good idea to book early!

The course runs from 16-20 September in the OR Society's training suite in central Birmingham. The fees are £2,850 + VAT for OR Society members; £3,100 for non-members. Book online at www.theorsociety.com, contact Jennie Phelps on +44(0)121 234 7818 or email jennie.phelps@theorsociety.com.

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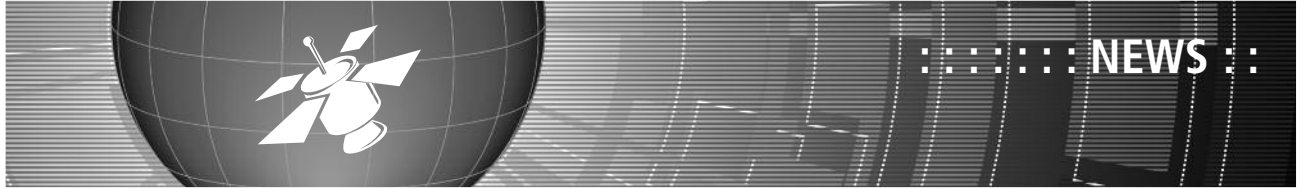
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THE PUBLIC KNOWS BEST?

JOHN CROCKER

Google Trends may provide an insight into an interesting social phenomenon but can its results provide more than this?

Lisa Grossman, writing in *NewScientist*, puts a good case for treating conclusions drawn from Google Trends with a degree of scepticism.

In 2008, Seth Stephens-Davidowitz started looking at the searches that people made on Google (of which there are around 100 billion each month). He reasoned that people would be more honest in their searches than they might be when answering questions for an opinion poll. He searched all of the searches made over a four-year period (2004-2007) for certain keywords which might indicate the searcher was racist. From this he was able to rank each State and lo and behold, those with the most hits proved to be those in which Barack Obama underperformed the most. From this, he drew the conclusion that racism had cost Obama between 3and 5% of the vote.

Google Flu Trends works in a similar way, it argues that the more people who search for 'flu symptoms', for example, the more likely there is an outbreak of flu in that area. For each of the years between 2009 and 2012, apparently the results were highly correlated with those of the US Centers for Disease Control and Prevention so, naturally, it was considered a success. This year, however, it dramatically over-reported flu rates.

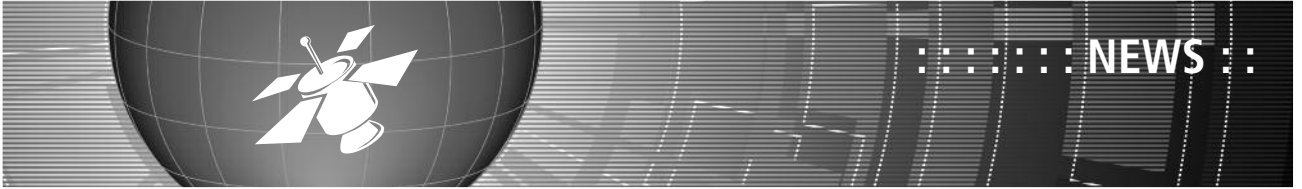
One of the problems with using searches as a source of data is that local events can have a dramatic effect on the numbers – a story in the local paper could trigger off a sudden surge in the number of inquiries. It is possible that such a surge could be interpreted as a

large increase in the number of instances rather than simply a lot of interest in one particular instance. A recently broadcast television programme or a project at the local school, or even an article in the *NewScientist* might generate a big jump in interest in a particular area. For example, in the same issue, there is an editorial on depression citing a longer article on the same subject inside in which there is a mention of keratin as a potential cure. At the moment, I believe keratin is used illegally as a 'recreational' drug. These articles could easily generate a dramatic increase in interest in this drug which could be interpreted by the Drug Squad as a big increase in abuse of this substance especially if there was a significant haul of cocaine, say, which might cause users to look for an alternative.

It is very dangerous to use data to establish relationships; it is far, far safer to derive the relationships from scientific principles and then use the data to help confirm your theories. If trend A is highly correlated with trend B, it could be because B happens as a result of A; A because of B; both happen totally independently or because both happen as a result of C. Ice cream sales tend to increase in very hot weather but you do not get hot weather by buying large quantities of ice cream. Salaries and obesity have tended to increase in line with each other but I would not recommend eating to excess as a way of getting a pay rise and there is no evidence to suggest that the fattest people get paid the highest salaries (certainly not based on a sample of one, at least).

<OR>

EVENTS WORLDWIDE
 To see the full listing go to:
www.theorsociety.com/Pages/NonSociety/NSEvents.aspx



APRIL IN PARIS, SALFORD IN JULY!

NIGEL CUMMINGS

Maybe it does not have quite the same ring as April in Paris but this was the venue for the 5th European Conference on Information Management Systems in Operations.



Professor Qiang Shen

Anyone who chose to go to EURO in Rome will have missed Professor Qiang Shen, Head of the Department of Computer Science at Aberystwyth University, Fellow of the National Academy of Wales and a member of UK Research Excellence Framework on Computer Science and Informatics. His major research interests include computational intelligence, fuzzy and qualitative systems, reasoning under uncertainty, pattern recognition, data modelling, and the real-world application of such techniques for decision support.

Opening this year's IMSIO conference, Professor Shen launched into an energetic presentation, which ran at a breakneck speed for nearly one and a half hours. During this time he packed a huge amount of information into a presentation that dealt with feature selection in intelligent information systems. His presentation detailed theoretical concepts, highlighted the differences between rough and fuzzy rough feature selection and provided numerous application examples.

Part of his presentation showed a 'noisy' sea of words from which the correct search algorithm could extract key, accurate and concise textual information. As an example, he showed how by applying machine aided analysis to another noisy sea of words in which the relevant information seemed hopelessly drowned, it was possible to deduce the train time from London to Aberystwyth.

His presentation shone considerable light on what is traditionally seen as a complex subject and he showed us that feature selection was 'nothing but dimensionality' that involved reduction and selection techniques to isolate subjects. This led onto detailed methods for isolating data semantics and improving model transparency, learning and runtime performance and how it was possible to unearth hidden relationships and, discover and generate new subsets for further evaluation that evaluates the 'goodness' of subsets.

We have all heard about fuzzy sets and fuzzy logic now there are 'rough' sets and techniques for mapping out rough set attributes, reducing them and applying evaluation functions. Another topic discussed was the application of the 'greedy hill climbing' algorithm, though he emphasised that many other search algorithms could be employed within the feature selection mechanism if desired.

With rough sets comes 'fuzzy rough selection' which deals with 'real-valued features in fuzzy sets'. The subset generation methods employed in this work included 'genetic algorithms, harmony search, background illumination, fuzzy entropy and fuzzy discernability functions'.

One of the applications in which feature selection by machine Information Systems could be applied was in the analysis of images returned to Earth from Mars. Other applications nearer to home were in the area of forensics such as glass fragment modelling.

Some aspects of Professor Shen's presentation were confidential as they concerned work he had done for the government. An edited recording of this talk should be available via our website at some future point.



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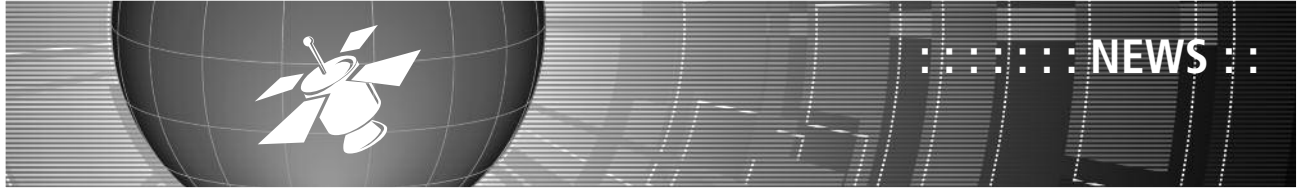
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- **Interwrite[™] Response** - a classroom response system. Using radio frequency or infra-red handsets, students respond to questions presented in PowerPoint, the internal question editor, or to impromptu questions asked verbally. The system can support thousands of students. Cost depends on the handsets being used. Prices start from as low as 31 GBP + VAT per handset. Accompanying software is included with the receiver kit, cost depends on the system being used. Discounts available for volume purchases of handsets.

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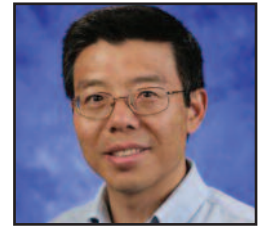
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PATIENT! HEAL THYSELF!

NIGEL CUMMINGS

Genetic profiling assisted by mathematical modelling is helping to provide personalised treatments for disease.



Rongling Wu

Medicines that are personally tailored to your DNA are quickly becoming a reality, thanks to the work of U.S. and Chinese scientists who have developed statistical models to predict which drug is best for specific individuals with specific diseases.

According to Rongling Wu, Professor of Public Health Sciences at Penn State College of Medicine, USA, 'Traditional medicine doesn't consider mechanistic drug response. We want to look at how an individual person responds to an individual drug by deriving and using sophisticated mathematical models, such as differential equations.'

Medication can be prescribed by adopting a pharmacogenomic approach, but researchers recognise the limitation of this approach in predicting a response to a particular drug and dosage combination. Pharmacogenomics uses a person's genes to explain the difference between how one person responds to a drug compared to another. The team's equations take this field one step further by also including information about how the body processes a drug and how the drug acts in the body.

Rongling Wu studied drug response and drug reaction, and in particular pharmacokinetics, which influences the concentration of a drug reaching its target, and pharmacodynamics, which determines the drug response. Metabolic, environmental and

developmental factors also play a role in medication response.

The research has assisted in the creation of a statistical analysis framework of differential equations that will help doctors and pharmacists, by simulating such variables as protein-protein and protein-DNA interactions a drug has in a patient. The framework characterises a drug's absorption, distribution and elimination properties, yielding information on pharmacological targets, physiological pathways and, ultimately, disease systems in patients, this results in fairly accurate predictions of treatment effectiveness.

The analysis framework is work-in-progress though, and will be expanded to shed light on the variability of drug response based on information the medical community continues to gather about how an individual responds to a particular drug and dose combination. The information collected is then combined with information about the patient's genes, proteins and metabolism to help determine what drug and dose might be best for that person.

'If we know how genes control drug response, we can create a statistical model that shows us what will happen before using the drug,' said Wu, 'this means a future with more effective medications, faster healing and fewer side effects'.

<OR>

TWO SUPERB CAREER DEVELOPMENT OPPORTUNITIES THIS SEPTEMBER

The OR Society's training programme is back in action after the summer break! The first two courses in September are **Introduction to Credit Scoring** and **Introduction to O.R. II**

As the title suggests, the 'Introduction to Credit Scoring' course provides an overview of what credit scoring is, how it developed and how it fits into the credit industry as well as covering the business problems it addresses. The topics include statistical and alternative methods of constructing scoring rules, how to process data prior to model building, how to assess and monitor scorecards and current developments and new applications of credit scoring techniques.

This hands-on course will be delivered by Jonathan Crook and Galina Andreeva on 11 September in Birmingham; fees are £625+VAT for OR Society members.

The 'Introduction to O.R. II' course is a great way to develop your skills of a wider range of O.R. techniques than you use every day. There's no need to have attended Part I to benefit as these as stand-alone courses that cover different techniques. The topics covered in

'Introduction to O.R. II' include Problem Structuring Methods, System Dynamics, Statistical Methods in O.R.: multivariate models, Data Envelopment Analysis and O.R. in Strategy.

This hands-on course has been designed by Frances O'Brien and Stewart Robinson and each topic is led by an expert in the relevant field from one of the UK's top Business Schools. The course runs from 16-20 September in the OR Society's training suite in central Birmingham. The fees are £2,850 + VAT for OR Society members.

How to book

More details of all OR Society training provision can be found at www.theorsociety.com where you can also book online. Alternatively, please Jennie Phelps on +44(0)121 234 7818 or email jennie.phelps@theorsociety.com.

<OR>

THINKING ALLOWED!

JOHN CROCKER

Miles Weaver at Napier University was the host with members of the [OR Society] Board, PMW (Publicity, Membership and Website committee) and one or two interested parties in attendance for a discussion on Thought Leadership and a chance to demonstrate the capabilities of synchronous on-line conferencing.

As with a number of UK universities, Napier uses 'Blackboard Collaborate' which also happens to be the delivery platform of choice identified by the charitable project looking at online teaching (and funded by the OR Society).

Although the main topic of the meeting was to discuss the idea of a quarterly 'Thought Leadership' seminar I have to admit that my mind was more obtaining some useful firsthand experience of how synchronous, on-line sessions might work. From this point of view, some of the problems encountered were actually quite useful in so far as they highlighted a number of the issues that will need to be resolved if the OR Society does decide to offer synchronous, on-line courses.

As to the original purpose of the meeting, the main idea is to hold quarterly meetings, on-line, to discuss some of the more important issues of the day for which O.R. might be able to offer some benefit. A little while ago there was some discussion on how we, as a Society, might be able to make our voice better heard when it comes to subjects such as climate change, nuclear versus wind versus shale gas (fracking); the depletion of fish stocks or the best way to increase runway capacity within the London area.

Given the participants in such debates are unlikely to be located within any given region (even in the case of London airports), these debates would have to be arranged as a special event, part of one of the Conferences or using some form of synchronous on-line conferencing. Although the obvious solution is the on-line

'As to the original purpose of the meeting, the main idea is to hold quarterly meetings, on-line, to discuss some of the more important issues of the day for which O.R. might be able to offer some benefit. '

conferencing, this will only work if it is well planned. For the benefit of those of us who suffer from hearing difficulties, I would suggest all participants should use a good microphone which remains switched off except when that person is talking and, that everyone remembers to talk directly into the microphone.

The verdict was that only one person was against the proposal for a regular, on-line, 'think-tank' to discuss hot topics with six in favour. (The members of the Board who had kept us all waiting for some 20 min also left early so were not on-line when it came to the vote.)

<OR>

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.

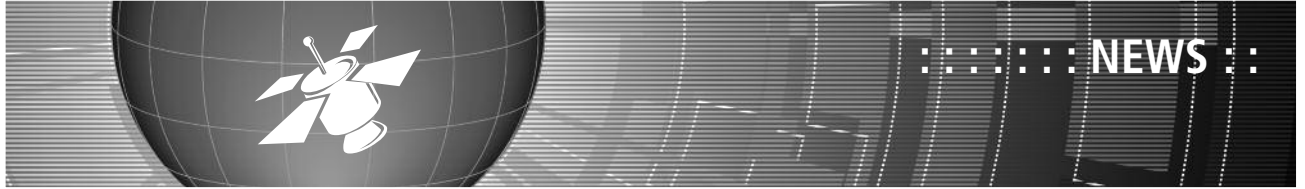
William England
Panagiotis Ntontos

Manchester
Canterbury

Gowtham Bharatwaj Srinivasan

Canterbury

<OR>



THE FOURTH MAN

JOHN CROCKER

In the August issue, *OR-30* made mention of a certain gentleman by the name of Dr Cecil Gordon.

Jonathan Rosenhead has drawn my attention to the fact that Gordon was the fourth man in the 'group of four' who formed the Operational Research Club – the other three being Professor P.M.S. Blackett, Sir Charles Goodeve and Sir Henry Tizard. Furthermore, Jonathan wrote a memoir of Dr Cecil Gordon which was published in full in *JORS* in 1989.

If you are like me, you will have never heard of Cecil Gordon and yet in the late 1940's he was clearly at the forefront of Operational Research. We commemorate Blackett every year with a lecture named in his honour and the Goodeve Medal is the Society's principal honour but Gordon's name has all but faded into obscurity.

At the time, autumn 1947, that the four had dinner together at the Athenaeum, Gordon was head of the Special Research Unit at the Board of Trade. In this role he was the most senior O.R. man in government. His appointment to this position was largely as a result of the work he had done at RAF Coastal Command during World War II but before we look at that, it is interesting to see how he came to be doing operational research in the first place.

Gordon was born in South Africa, to poor Russian, Jewish refugees. He matriculated early, did a BSc at Cape Town in general sciences, followed by an MSc in Physics but it was in zoology that he did most of his original work, mainly on fruit flies. Having befriended Lancelot Hogben he moved to the London School of Economics – his passage being paid for by a local Jewish charity – shortly after Hogben had taken up a professorship at LSE having somewhat out-stayed his welcome in South Africa because of his feminist and anti-eugenics views.

Cecil joined the Communist Party in the 1930's and was also an active member of the Association of Scientific Workers. It was probably this that got him into the O.R. Section of Coastal Command in 1942. Many of the original O.R. people were of a similar political persuasion.

Having survived the Battle of Britain, the major threat was from U-boats. These were sinking an alarming tonnage of merchant shipping and although the Navy had managed to sink 46 of them by the end of 1941, RAF Coastal Command (CC) had only managed four. The depth charges were set to explode at a depth of 100 feet, on the assumption that the U-boat commander would have spotted in incoming plane and gone into a dive. However analysis showed that U-boats were only damaged when they were caught on the surface. Changing the depth setting to 30 feet and painting the aircraft underbelly white to reduce visibility greatly improved the hit-ratio.

However, Churchill also wanted CC to double the number of sorties over the Bay.

Unfortunately, there were no new aircraft available to CC so they had to find a way of increasing their utilisation rate. What Gordon discovered was that the RAF operated a policy based on 'serviceability level' (SL) – the percentage of aircraft capable of flying at any given time. What this implied in practice was that aircraft were not being utilised to their maximum potential (for fear of the SL falling below 75%).

He persuaded Coastal Command to allow one squadron of Whitleys to disregard the SL directive and fly every available aircraft whenever conditions permitted. Sure enough, the achieved SL rate dropped drastically but the number of sorties flown very nearly doubled. This, on its own, was not really sustainable since the amount of maintenance needed is roughly proportional to the number of hours flown and as they would not have access to any additional maintenance facilities or resources, there would come a time when all the aircraft would be in maintenance. Whilst this particular squadron was flying this new regime, care was taken to record as much data as could be collected particularly with respect to maintenance activities.

From this, Gordon came up with the concept of 'flying hours per maintenance man' (or in today's terms, maintenance man-hours per flying hour). Gordon divided the maintenance tasks into major and minor inspections to be carried out after a given number of flying hours or sorties. Better organisation and management of the maintenance crews also meant that this increased level of flying could be sustained without the need for more mechanics. So impressive were the results that Gordon was given the task of implementing this new policy throughout the RAF and fleet air arm, he was also awarded an OBE in 1946 for this work. (Incidentally, the total number of U-boat kills, by the end of the war, was CC 215, RN 269.)

<OR>

'Cecil joined the Communist Party in the 1930's and was also an active member of the Association of Scientific Workers.'

HARD OR SOFT?

JOHN CROCKER

Ion Georgiou, Research Professor, Fundação Getulio Vargas, Brazil has written a very interesting letter to the Harvard Business Review entitled 'Getting Serious About Messes'.

In it he attempts to explain the problems that managers face and how soft O.R., in general, and problem structuring methods (PSM), in particular, address these problems.

Georgiou bemoans the fact that managers are badly let down by educational establishments, the press, some of their own learned societies and by 'airport' books. When I read the opening sentence of his second paragraph, 'Managers are not fools', I was intrigued.

The earlier part of the letter explains the difficulties faced by today's managers. Their problems are typically unbounded, 'wicked' 'messes'. Data, if any is available, is likely to be unstructured, inconsistent and incomplete. Very often the most useful bits are in the form of [cryptic] comments which, as we know, are notoriously difficult to process electronically. These messes are also by no means static and, of course, the individuals involved will be contributing to and a part of this mess. In Yorkshire, they have a saying, 'There's nowt as queer as folk', and this is very true. There will be those who, out of the best intentions, make the mess even worse and, of course, there will also be those who out of the worst of intentions also add to the problems. One of the lessons I learnt from my very first project back in 1970 was that it doesn't matter how good your model maybe, it is the workers on the shop floor (or in this case the boiler room) who have the last say.

There have been many pleas and arguments put forward by operational researchers from outside the US (not least from within the UK) for INFORMS to recognize 'soft' O.R. Whether this letter will have the desired effect only remains to be seen. It has been observed that new scientific theories only become accepted when

all of the old scientists have died out. Unfortunately, with the editors of journals, it is common practice for the current ones to nominate and propose their replacements which does nothing to improve the chances of bringing about changes to editorial policy

What makes this process even less likely to achieve a significant change is the fact that income from journals is a major source of revenue. Changes to policy could affect the ratings and hence the attractiveness of the journal which will almost certainly have an impact on this income. The fact that it might make the journal more attractive to a wider audience and actually improve the ratings is, at best, suppositional and, as such, risky.

Surely one of the primary purposes of O.R. is to provide the means to bring about change for the better. It was never intended to be an esoteric branch of mathematics. It is particularly ironic that the US OR Society (INFORMS) incorporates 'Management Sciences' in its name and yet ignores this very important area which is so directly relevant to managers and their ability to get themselves out of wicked messes.

If you do nothing else this week, I urge you to read Georgiou's Open Letter – if you are a practitioner, I am sure you will recognize much of what he describes – if you are an academic then this may help you put into perspective where we practitioners are coming from.

<https://sites.google.com/site/iongeorgiou/open-letter-to-the-harvard-business-review>

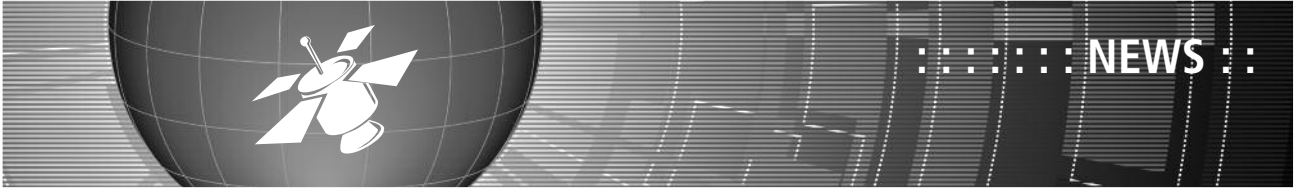
<OR>

O.R. CONTACTS IN SRI LANKA?

Do you know anyone who is currently working in, or studying, O.R. in Sri Lanka? Do you think they could be persuaded to act as a local contact for the organisers of an International Conference on O.R. for Development (ICORD) which is currently under consideration? If so please let Sue Merchant know: suemerchant@hotmail.com. Thank you



<OR>



ANOTHER ONE BITES THE DUST

JOHN CROCKER

In my limited experience, O.R. projects tend not to run into multi-millions of pounds however, there are a number of cases where IT projects have done so and gone alarmingly over time and budget.

Occasionally, the decision will be made to 'pull the plug' rather than 'throw good money after bad'. One such example is the BBC's Digital Media Initiative (DMI) technology project which had apparently run up a cost of £100 million before it was scrapped in June having never worked.

No doubt there will be a very large sum of money spent on trying to find someone to blame. As Charlie Mayes, DAV Management points out, failures of projects such as this are both common place and very rarely the result of any one person but tend to be the result of a large number of small problems and minor deviations.

Very often with IT projects of this type, Pareto works in reverse, so to speak; 80% of the effort returns [at most] 20% of the benefits. Even when these massive IT projects do get completed, there inevitably follows an inquiry into why they are not producing the return on investment that was initially promised. In many cases, this is because the project, itself, is not intended to yield a ROI, rather it is designed to provide the means or the data for future projects that will. Decision makers often do not seem to understand that data, per se, is worthless. It is not until it has been converted into information or knowledge that it starts to have any value but by the same token, the information and knowledge cannot be obtained without the data being collected and held in a way that makes possible access to and analysis of it in the first place.

It is well recognised that projects will seldom be given the go-ahead unless they are 'guaranteed' to show a ROI and that the payback

period is extremely short. For some reason, this requirement seems to get relaxed the more expensive the project and the higher up the food chain the sponsor. It is as if there is a belief that if a project is going to cost that much and take that long it must *ipso facto* be worthwhile. Of course there will be massive kudos for the director if the project does perform as well as claimed. And when it does not, the director who authorised it will no doubt have moved on to a new role and hence deny any responsibility for its failure claiming that it was on target when he (and I use the male gender deliberately) was in control.

The question however is, 'When is enough, enough?' An obvious decision point is when the cost of the project, to date, exceeds the total expected revenue. Very often, the revenue is based on achieving a certain share of the potential market. This share is likely to be severely cut if your product is not the first in the field. The longer it takes to develop the product, the higher the probability yours will not be first however, it is not until someone has produced a rival product that your market share is likely to be affected (unless, of course, the need for the product has melted away in the meantime or been replaced by some new technology that makes it irrelevant).

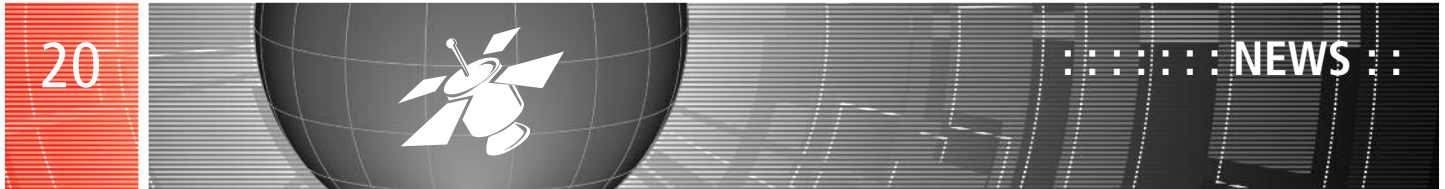
As with so many of these cases, O.R. is in the best position to answer these questions but how often is it used in this context or, indeed, at any stage during the course these large IT projects?

<OR>

SPECIAL INTEREST GROUPS

Contact details for all special interest groups and meetings past and present are listed at:

<http://www.theorsociety.com/Pages/SpecialInterest/SpecialInterestList.aspx>



CAREERS OPEN DAY 2013

LOUISE ORPIN, EDUCATION OFFICER

Who will be exhibiting this year? I'm excited to announce the following confirmed exhibitors so far for the 2013 Careers Open Day. With a new venue and some exhibitors new to the Careers Open Day, this year's event is set to be a great showcase for careers in O.R. and Analytics.

Admiral



Since it launched in 1993, Admiral's story has been an interesting one. The company has grown from a small start up to one of the largest car

insurance providers in the UK, and with a presence in seven countries. However, it has managed to keep the unique culture of a much smaller company and has won several awards for being a great employer. It is still based in South Wales, and is one of the largest employers in the region, with over 5,000 members of staff. Visit <http://www.admiralgroup.co.uk/index.php> for more information, for details about careers visit <https://admiraljobs.co.uk/#!home>

British Airways



Flying is a complex business, which makes the airline industry one of the most varied and intensely challenging environments to manage. Making the right decisions on network, fleet, sales, marketing, operational logistics and customer loyalty to name but a few is key to British Airways success. Our Operational Research team uses analytical skills to support decision-making, initiate change and make key issues less complex. In fact, they're critical to taking our business forward. Working closely with people at all levels, you'll be involved with high profile projects right across the organisation. Visit

http://www.britishairways.com/careers/graduateprogrammes/graduateprogrammes_orgp.shtml for information about the O.R. Graduate Programme and http://www.britishairways.com/careers/analysthub/analysthub_home.shtml for other analyst jobs.

Cardiff University



Our innovative and award winning MSc programmes will equip you with the necessary analytical skills, methods and ways of thinking to tackle and analyse complex organisational problems, help make better decisions, and to become confident statistical analysts. Delivered by experts in the fields of Operational Research and

Statistics, the skills that you will learn are highly transferable for use within industry, business and the public sector. You will study a variety of problem-solving techniques, allowing you to build and use mathematical and statistical models, alongside skills to develop your abilities to communicate effectively to others. Visit <http://www.cardiff.ac.uk/math/masters> for more information.

Defence Science & Technology Laboratory (Dstl)

Dstl is a trading fund of the Ministry of Defence (MOD), delivering trusted and impartial advice and solutions for defence-related science and technology issues that impact on the security of the UK. It's demanding, exciting and rewarding work and each year Dstl recruits approximately 80 graduates to be part of it.



Graduates receive a balanced programme of courses to develop technical and non-technical skills. Sponsorship is available to gain Chartered status and take further qualifications. There are also opportunities for secondments, both in the UK and overseas. Details of Dstl's current graduate vacancies can be found on our website at www.dstl.gov.uk/careers.

dunnhumby



dunnhumby is the world's leading customer science company. We analyse data and apply insights from more than 400 million

customers across the globe to create better customer experiences and build loyalty. Our insights and strategic process help clients create competitive advantage and enjoy sustained growth. dunnhumby employs more than 2,000 employees in offices throughout Europe, Asia and the Americas, and serves a prestigious list of companies including Tesco, The Kroger Co., Coca-Cola, Macy's, Procter & Gamble, PepsiCo and Shell.

For more information, please visit us at

www.dunnhumby.com/yourfuture

Government Operational Research Service (GORS)

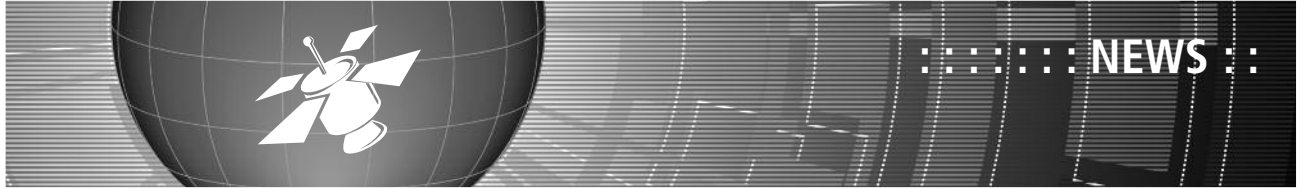
The Government Operational Research Service (GORS) supports and champions Operational Research



(O.R.) across government. O.R. specialists advise government on how to make the best possible use of public money. With their skills in modelling and analysis, they help formulate government policy and find effective ways of putting it into practice.

Operational research is about working with policy makers and managers to solve tomorrow's problems today. It calls for scientific methods of analysis and a systematic exploration of the quantifiable aspects of key problems. O.R. analysts are there to give managers objective advice on the most appropriate options for future action.

Visit <http://www.operational-research.gov.uk> for more information.



Tesco



We're market leaders in what we do. Our projects focus on delivering major improvements to Tesco's supply chain through improving product availability, product security, reducing waste, removing costs, and improving our processes. You'll be joining a high-profile team within Tesco who combine analytical problem-solving with the real world challenges of implementing change quickly within one of the world's largest retailers.

Supply Chain: We manage and improve how the supply chain operates, including promotions, events and new store openings. We work across the business with marketing, buyers and suppliers to make sure plans come together and stock flows seamlessly into our stores.

Replenishment: We manage and improve the processes within stores to keep our shelves full and keep products available for customers. From the warehouse to the shelf, this includes replenishment operations and merchandising the stock control.

Development: We work across the supply chain to improve systems and processes. We work with our IT division to introduce new technology, and with the operations teams to improve core purpose and improve the customer experience.

Shrinkage & Security: We have the accountability for managing unknown loss within our stores and distribution network. In addition, we ensure the safety of our customers and staff.

Visit our website for more careers information, <http://www.tesco-careers.com/page.cfm/content/supply-chain-about-us/>

University of Westminster

The department of Business Information Systems offers three interlinked MSc courses: Business Intelligence and Analytics (BI&A), Business Information Systems, and Database Systems.



The innovative MSc BI&A addresses the need to propel information-gathering and data organisation, and exploit potential information and knowledge hidden in routinely collected data to improve decision-making. It focuses on developing solutions to real-world problems associated with the changing nature of IT infrastructure and increasing volumes of data, through the use of applications and case studies, while gaining a deep appreciation of the underlying models and techniques.

We work closely with various business sectors and have wide experience in the provision of consultancy and research services, and student project placements.

Web:

www.westminster.ac.uk/courses/subjects/business-information-systems/postgraduate-courses

Visit www.TheORSociety.com/CareersOpenDay for more information about the Careers Open Day.



MAKING AN IMPACT: IN PRACTICE

BY RAMUNE GEDGAUDAITE

Looking for new approaches for your day-to-day analytics projects? Interested to find out what your O.R. colleagues are up to in their day jobs? Fancy the challenge of solving someone's problem during academic-practitioner collaboration session?

Making an Impact day at OR55 aims to cover all of above, as well as providing a unique environment for getting to know your peers during the speed networking session where you can get to know anyone from a brilliant young analyst to an old analytics wolf.

We have an excellent set of workshops lined up with something to appeal to everyone. Technique tasters cover varied topics including Data Visualisation, MCDA, Systems Dynamics, General Morphological Analysis. There will be discussion sessions on *What is Needed to Help Analytics?*; *O.R. Practitioners to Have Real-World Impact?* and; on *How do you see the practice of O.R. developing in future?* The hot topic of Data Science will be covered and there will be an introduction to the new UK Data Service. Then there is the chance of a controversial debate in a session entitled *Agile – Project success or project chaos?*

The academic-practitioner session where O.R. practitioners identify problems that would benefit from research input, and researchers identify ideas that need practitioner input has to be a 'must' for everyone. There is still time for last minute entries for this: if you want to submit a poster please contact janeparkinch@gmail.com

Follow us on Facebook or Twitter (@ORSocMA1day; #MAI55); go to the webpage (<http://www.theorsociety.com/Pages/Conferences/OR55/OR55Making.aspx>); and book your place now!

We look forward to seeing you there.





THE OR SOCIETY

Blackett Memorial Lecture

The Society is pleased to announce that the 2013 Blackett Memorial Lecture will be given by

David Spiegelhalter FRS, OBE

Winton Professor for the Public Understanding of Risk,
at the University of Cambridge

The suggested title of the lecture is:

Communicating risk and deeper uncertainty

David Spiegelhalter is the 'Winton Professor of the Public Understanding of Risk' in the Department of Pure Mathematics and Mathematical Statistics at the University of Cambridge, Honorary Professor of Biostatistics in the Institute of Public Health, and Senior Scientist in the MRC Biostatistics Unit. He specialises in the theory and application of Bayesian statistics and, in particular, started the BUGS project for popular Bayesian software. His medical work focuses on the assessment of clinical performance, and he contributed to both the Bristol and Shipman Inquiries and now consults for the Healthcare Commission. He was elected a Fellow of the Royal Society in 2005 and was awarded an OBE in 2006.

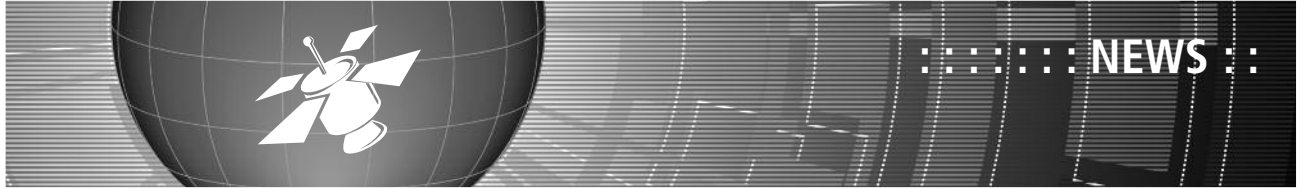
Thursday 28 November 2013

The Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG

Lecture at 4.30 pm

(Tea and biscuits at 4.00 pm; Drinks reception after the lecture)

There is no charge for attendance at this event. To register and receive joining instructions please go online to www.theorsociety.com/blackettlecture and fill in the online reservation form or contact Hilary Wilkes on hilary.wilkes@theorsociety.com



SIMULATION WORKSHOP

THE OR SOCIETY'S 7TH SIMULATION WORKSHOP (SW14)



HELD IN COOPERATION WITH: THE INFORMS SIMULATION SOCIETY AND THE SOCIETY FOR MODELING AND SIMULATION INTERNATIONAL (SCS). 1-2 APRIL 2014, WORCESTERSHIRE, UNITED KINGDOM

The biennial OR Society Simulation Workshop brings together practitioners and academics working in the field of discrete-event simulation and related fields. It provides an opportunity to exchange ideas on the current and future state-of-the-art in simulation and modelling. The programme consists of a key note presentation, panel discussion and parallel streams. Breaks between sessions and the conference dinner provide an excellent opportunity for networking. The exhibition area includes poster display and some of the latest developments in simulation software tools.

Location

The Abbey Hotel Golf and Country Club is situated in Worcestershire on a lovely 175-acre estate that once belonged to the now ruined local abbey. It provides an excellent standard of accommodation and conference venue. There are also leisure facilities and a championship standard Golf Course.



Abbey Hotel

The hotel is near to Birmingham, which has excellent links through the International Airport and railway services. London is only 1.5 hours away.



Stratford-upon-Avon

Local attractions include Stratford-upon-Avon (Shakespeare's birthplace) and Warwick's Medieval Castle.

The Programme

The workshop will include plenary sessions, special focus streams, simulation practice sessions and posters. Contributions to the technical programme are sought in the following areas, although papers in any area of simulation modelling and analysis will be considered.

Simulation Modelling Methodology

- Component based simulation
- Collaboration methods
- Distributed simulation
- Web based simulation
- Simulation and the grid
- Simulation and artificial intelligence
- Simulation visualisation
- Simulation software

- Simulation standards
- Human performance modelling
- Agent-based simulation
- Service-oriented simulation
- Conceptual modelling
- Verification and Validation

Simulation Analysis Methodology

- Design and analysis of simulation experiments
- Simulation optimisation
- Risk Analysis
- Metamodelling

Simulation in Practice

- Simulation in manufacturing
- Simulation in services
- Simulation in defence
- Simulation in healthcare
- Simulation in semiconductor industry
- Simulation practice
- Simulation education
- Energy modelling
- Environmental simulation
- Supply chain and transportation modelling

All submissions will be peer reviewed. Accepted papers will be published in the conference proceedings and will be presented at the conference. Presentations will be given 30 minutes including time for questions and answers.

The **Simulation Practice Stream** provides an opportunity to submit a shorter paper (3 to 5 pages). These papers should either describe a novel application of simulation or provide some insight into how the use of simulation might be improved. Contributions from simulation practitioners are particularly encouraged.

Posters of applied or research projects in simulation will be displayed during the conference. A poster session is provided where delegates have 1 minute to briefly introduce their work.

Timetable and Deadlines

1 November 2013: Submit electronically contributed papers not previously published or presented. Submission instructions will be found soon at www.theorsociety.com/SW14. Each submission must be a 4-10 page paper (3-5 pages for the Simulation in Practice Stream), including an abstract of less than 150 words.

Submission implies that an author will attend the workshop to present the paper, and all clearance required for publication of the paper will be obtained by 14 February, 2014.

10 January 2014: Contributors will be notified whether or not their paper has been accepted.

14 February 2014: Authors provide the final manuscript for inclusion in the conference proceedings. These should be in the format required for the conference. Author instructions will be available soon at www.theorsociety.com (in the conferences section).

14 February 2014: Submit poster title and abstract of 150 words. These should be submitted using the electronic submission form for full contributed papers. Submission implies that an author will register to the conference. Posters abstracts will be published in the conference proceedings and should follow the guidelines for conference papers.

If you require any further information on paper or poster submission, please contact the programme or poster chairs: Dr Stephan Onggo and Dr Cathal Heavey (Programme) or Dr Thomas Monks (Posters).

Conference Fees

Conference fees include attendance at all conference sessions, lunches, mid-session teas and coffees and a copy of the conference proceedings. Accommodation and breakfast are not included. **Student registration fees are for student members of the OR Society.**

	Early registration (up to 31 January 2014)		Registration (after 31 January 2014)	
	Excl VAT	Inc. VAT	Excl VAT	Inc. VAT
Members	£300	£360	£350	£420
Non-members	£370	£444	£420	£504
Students	£140	£168	£140	£168

(Members of associated Societies; INFORMS and SCS qualify for member's rate)

Single Occupancy Ensuite Accommodation fees for a delegate are £80.00 + VAT per night and includes evening meals. Double Occupancy Ensuite Accommodation fees will be £100 + VAT per night. For full information please go to: www.theorsociety.com/SW14.

Organising Committee

Conference Chair

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Programme Committee

Professor Shane Henderson Professor Roger McHaney Professor Eleftherios Iakovou Dr Andrew Beck Prof Sally Brailsford Dr Roger Brooks Professor Russell Cheng Professor Stephen Chick Dr John Crocker Dr Christine Currie Dr Mark Elder Professor Paul Fishwick Dr Murat Gunal	Cornell University Kansas State University Aristotle University of Thessaloniki British Airways University of Southampton University of Lancaster University of Southampton INSEAD Data Systems & Solutions University of Southampton SIMUL8 Consultant University of Florida Deniz Harp Okulu (Naval Academy) Turkey Cardiff University The International Hellenic University Saker Solutions University of Warwick University of Warwick Old Dominion University Brunel University Auburn University University of Lancaster University of Loughborough Durham University Lanner Group Systems Navigator FOI - Swedish Defence Research Agency
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A WINDOW ON THE WORLD OF O.R.?

GEOFF ROYSTON



‘O.R. could claim to have had the power of invisibility for years, though not by desire; what we want is the opposite - a high-visibility jacket!’

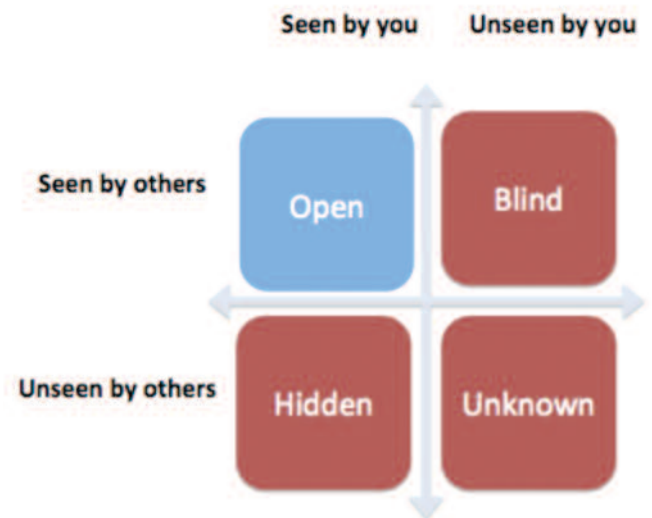
The ‘invisibility cloak’ of science fiction is now fact, albeit with limitations.

O.R. could claim to have had the power of invisibility for years, though not by desire; what we want is the opposite - a high-visibility jacket! Indeed, part of the mission of the OR Society is to help make our presence more visible. But perception involves both the observed and the observer. And all of us have open and hidden parts.

To help understand that, Joseph Luft and Harrington Ingham, two US psychologists, devised, back in the mid 1950s, an approach called (after the first parts of their names) the Johari window, as illustrated below.

The ‘open’ window pane is the part of ourselves that both we and others see. The ‘hidden’ window pane is our private space, which we

The Johari Window



know but others do not. The ‘blind’ window pane is what others see but we are not aware of. The ‘unknown’ is the part of us that is seen by neither ourselves nor others.

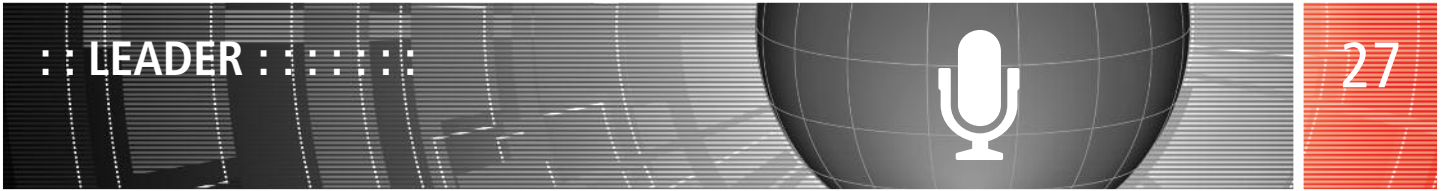
A Johari window for O.R.?

The Johari window was designed to illuminate interpersonal perception, but can we perhaps apply the idea to perceptions of O.R.?

The ‘open’ part would be the traditional part of O.R.– quantitative analysis in routing, scheduling, packing etc - what might be called ‘decision physics’.

The ‘hidden’ part might be the softer parts of O.R. – although I’m sure we don’t *actively* hide it, managers nevertheless often don’t see that we can help with problem framing and structuring tasks, not just with crunching numbers.

The ‘blind’ part could be the behavioural aspects of issues – by our focusing strongly on modelling the ‘physics’ rather than the



:: LEADER :: :: :: ::

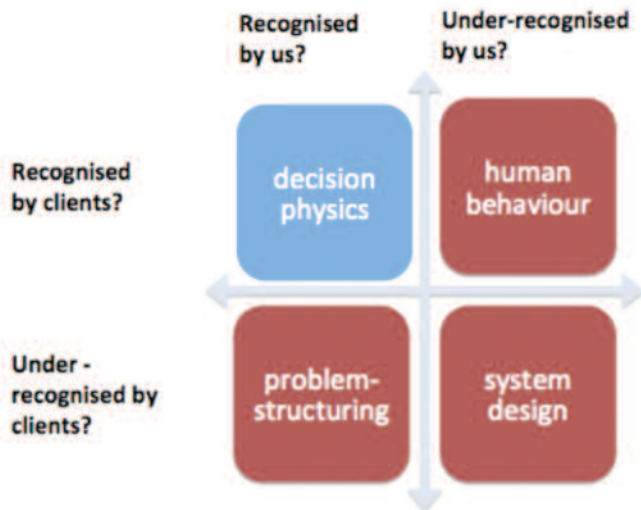
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'psychology' of situations O.R. seems to be a bit behind, compared to say some parts of economics, in incorporating into our models the latest developments in the science of human thinking and behaviour.

Finally, what about the 'unknown' part? A candidate for this might be our work on system design – as I have written about before, a high proportion of O.R. is about this but we often seem to give little recognition to or publicity for that compared to our work on decision making – and so risk both we and our clients underestimating its contribution.

If we are to fulfil a role as a visibly coherent science of systems improvement O.R. needs to openly embody *all four panes* of this

A Johari Window for O.R.?



window. This would involve more than purely presentational changes, it would require some *reframing* of education and training in O.R., about which I made some suggestions in the June issue of *Inside O.R.* One result of that reframing should be to gain a position where both we and our clients see us through an integrated 'skills window' as shown below.

Fostering Behavioural Operational Research

I suggest that the biggest tasks are those related to opening up the two elements on the right of the skills window – a greater focus on modelling human behaviour and on enhancing our thinking about system design. I wrote something about O.R. and design in *Inside O.R.* last September and there is some work now going on to see how the OR Society might collaborate with organisations such as the Design Society and the Design Research Society to progress that area. What about modelling human behaviour?

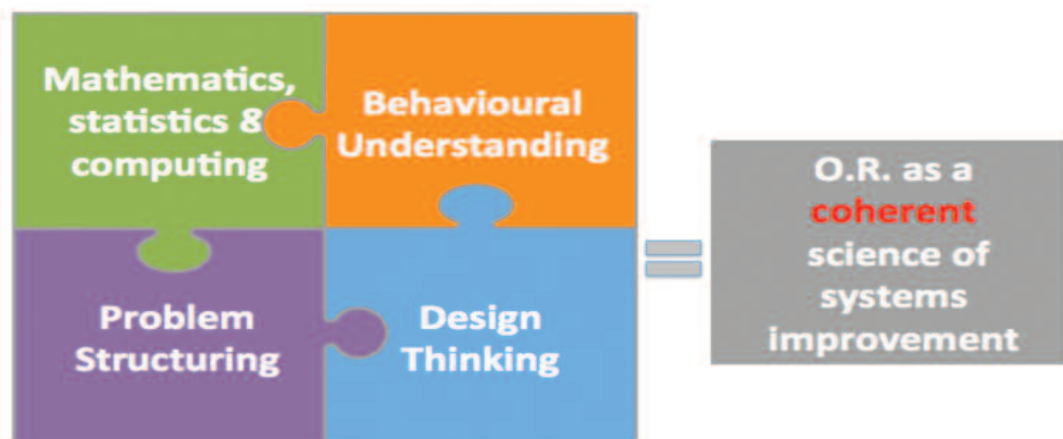
The performance of organisations and other human activity systems inevitably depends on the thinking and behaviour of all the people who work in, are clients of, or otherwise interact with them. So consideration of cognitive and behavioural factors should play a major role in O.R. and O.R., as a multi- or trans-disciplinary endeavour, should draw strongly on the behavioural sciences.

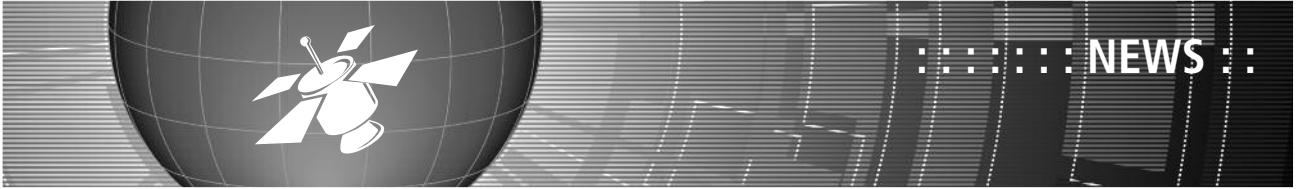
Recent publications indicate increased interest in behavioural and cognitive aspects of O.R. Many address mainly 'process' related issues such as how people understand O.R. models. That is an important issue but behavioural and cognitive O.R. needs also to embrace 'content' related issues, by analysing and modelling the behavioural and cognitive elements of the situation or system that is being investigated. Indeed in the specific field of operations management there is now a recognised topic of *behavioural operations*.

These are encouraging signs but there has not been a specific focus within the UK O.R. community for promoting and fostering this area. The OR Society is planning some activity to help speed growth and spread visibility and awareness. This could help bring what currently appear rather scattered efforts into a more coherent and systematic approach; under the umbrella of *behavioural operational research*.

A small group of members of the Society who are active in behavioural operational research and/or have a particular interest in it are beginning to address how the Society could best assist development in this area. If you are interested in participating in this initiative, do please get in touch with me (email: president@theorsociety.com).

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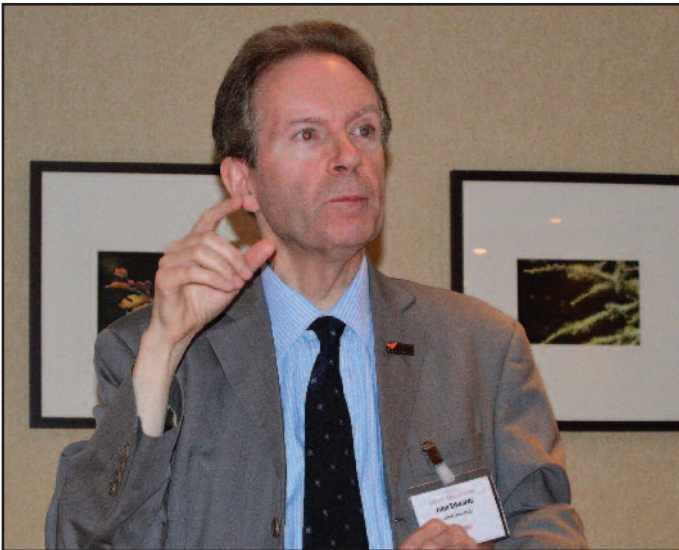




MESSAGE RECEIVED AND UNDERSTOOD?

NIGEL CUMMINGS

Professor John Edwards, Aston University, gave the opening plenary session at KIM 2013.



Knowledge sharing has been very well researched but possibly insufficient attention has been given by both researchers and practitioners to knowledge transfer. It is particularly important to consider the recipient of the knowledge, who, at the time, may not be known.

Knowledge sharing is often treated as a black box. People do not ask questions about it; they just say we need to do this and identify the knowledge they need to share. They do not think very much about what is actually happening when the sharing is going on, or not going on".

It was easy to find examples of where knowledge sharing did not work. The UK foot and mouth epidemic of 2001 was a classic case. After the previous major outbreak in 1968 a major report was published. Unfortunately none of the professionals dealing with the 2001 outbreak had been involved and none had thought to consult the reports from this earlier outbreak.

The first thing the paper concerning the outbreak of 1968 detailed was, "The moment that you know the outbreak has gone beyond two or three neighbouring farms, call out the Army. That is the only way you will get enough people involved to contain what is going on. You have to stop all movement of cattle, disinfect everybody and all vehicles going through the infected area."

Unfortunately, by the time this advice had been sought, it was too late. The infection had spread beyond the two or three farms and was far too widespread to be able to contain it. As a result, many farmers lost all of their stocks including a number of irreplaceable rare breed herds. Not only did it cause massive slaughter of herds, it also had serious repercussions on the tourist industry because of the restrictions on movement of people into and out of the infected areas.

This failure to share knowledge was not an isolated incident, it happened all too often. Another example concerned the British steel industry. When the industry was in the private sector, it was recognised that knowledge management was a good idea. This resulted in the setting up of a huge repository of data stored using Lotus Notes. Unfortunately the only people that ever used this repository were the project team who set it up.

Meanwhile in the Netherlands another steel company was undertaking a very similar project. They even used the same software - Lotus Notes.

A year or so later both the UK and Netherland-based companies merged to become CORUS. This resulted in a massive database with a great deal of duplicated knowledge. Had it been known that a merger was imminent, much of this duplication could have been avoided.

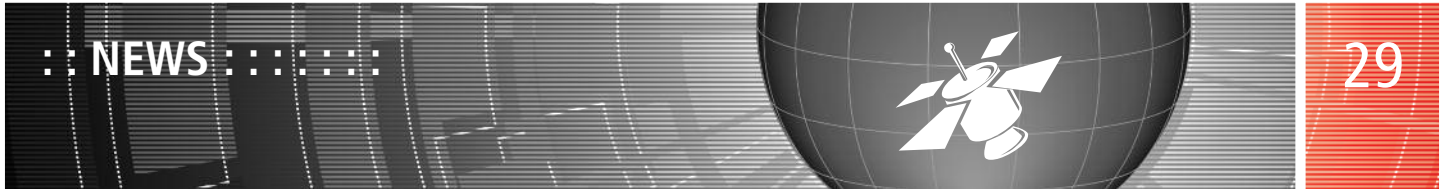
At this point, Prof Edwards suggested that there was a need to differentiate between "knowledge sharing" and "knowledge transfer". "Knowledge sharing" is a broad term that refers to a multi-directional, multi-dimension process which can also be unintentional whereas "knowledge transfer" is a one-way, usually top-down, intentional process. This makes knowledge transfer a special case of knowledge sharing.

Knowledge is combination of information, understanding and experience and, as such, is unique to the individual. An individual looking at the same information with a similar educational background may interpret that information in quite a different way depending on their experience.

Prof Edwards said that he liked to think of knowledge management systems as a triangle of people processes and technology. He thought we needed to think about process on two levels. The first level is connected with what the business process is and why it is necessary. The second process level is more concerned with why it should be done in this way.

There is a very big difference between receiving a message and understanding it. A tape recorder can be set up to receive messages but until you have listened to it and worked out what the other person is saying and you have interpreted it correctly (e.g. was it said with irony or sarcasm) has the shared knowledge been transferred. As Richard Feynman once said, "Knowing the name of something is not the same as knowing something".

Prof Edwards plenary at KIM 2013 was captured on video in its entirety – it has now been rendered into a video file which runs for 48 min. This file can be accessed from our website.



FROM FLOOD PREVENTION TO FRANKENSTEIN

BY SUE MERCHANT (VP IFORS)

I thought I would just whet your appetite for the latest IFORS newsletter <http://ifors.org/web/june-2013-newsletter/> which contains something for everyone, practitioners and academics alike.



There are a number of articles about **O.R. progress in developing countries**, including amongst other things:

- a description of the recent **ICORD conference in Rome** (supported by our own Jonathan Rosenhead and Leroy White – the latter hired a scooter to get about in Rome and lived to tell the tale!);
- a **conference in Buea** (who knows which country that's in? – get your atlases out!). One of its plenary lectures had the intriguing title of 'From Katie Scarlett O'Hara Hamilton Kennedy Butler to Pretzel Rods to Frankenstein for President to Taxi Wars – one odd O.R. Odyssey and lessons for Africa';
- an editorial about what **IFORS' support for developing countries** (which I had my arm twisted to write) : any comments from readers on how we could do better would be appreciated-please email me!

There is a **book review of Blackett's War** and a fine tribute to the late **Saul Gass** (who was a great supporter of UK conferences – I remember seeing him set out to run up Arthur's seat in Edinburgh!).

Finally see the call for entries for the **prize for O.R. in Development** and consider entering if you have done any work with a developing country.

The practitioner article about **flood prevention in Holland** is a most interesting read (with pictures!). The work won the Edelman award earlier this year and a paper on it is to be published in full in Interfaces early next year. There is also an account of one man's life practising **O.R. in the Philippines** (I liked the quote 'O.R. is magic') and no doubt airline employees will be interested in the **on line airline forum** Agifors, if they don't know about it already.

Those of you into **Analytics** may be interested in the article by the **INFORMS** director of communication about analytics in the US.



JUST ONE MORE...

NIGEL CUMMINGS

Britain is becoming a nation of gamblers, the UK gambling industry is booming, but as this boom continues, the numbers of gambling addicts will rise too.



It has never been easier nor have people been under so much pressure from advertising etc. Easy access to gambling sources via smartphone is partly to blame and new figures show almost one in 20 iPhone owners regularly use sports betting apps.

Could analytics provide a solution? Featurespace, a spin-out from the University of Cambridge Engineering Department think that it might. It uses machine learning techniques to identify people who show patterns that indicate 'problem gambling', before consulting psychologists on the best and safest preventative action to take.

Gaming sites collect data on the betting patterns of every one of their customers, including the time of day, frequency and size of bets placed as well as the types of games an individual typically plays. Featurespace analyses this information and builds up a picture of what is 'normal' for any given individual, and what would constitute erratic or uncharacteristically risky behaviour that might indicate gambling addiction.

Initially a consultancy, the company began working on fraud-detection solutions after winning a contract in 2008, and it was from its work in this area with gaming companies that the idea of looking at addictive behaviour emerged. Customers will make bets then later try to claim that they had not, probably because they were spending too much.

False claims made out of desperation suggested that maybe the customers needed better protection from themselves. Paradoxically, addicts are bad news for gaming companies as well. They much prefer players who yield a steady return over a long time than ones who lose a very large amount quickly then 'self-excludes'. Self-

regulation is always going to be preferential to draconian measures introduced by governments as knee-jerk reactions.

It is assumed that once addicted, a person's behaviour patterns will change. The main aim of the software therefore is to identify abnormalities in an individual's behaviour. This clearly begs the question as to what constitutes 'normal' behaviour. For machinery, it is generally safe to assume that it will operate in a rational, logical and, for the most part, predictable manner, such assumptions have no place when dealing with people.

Tracking the gambling, smoking, drinking, eating,... habits of individuals over a period of time can generate a picture of 'normality' for that person but what if that person is already addicted, or she goes on holiday or he has to go into hospital or any of a whole host of other reasons that could cause their habits to change.

Having identified a potential problem gambler, the next step is crucial. A wrong move, and the customer could simply head elsewhere to carry on where they left off. To minimise the risks of a wrong diagnosis, Featurespace works with psychologists to try to establish how best to communicate with customers identified as potential problem gamblers.

Gaming companies are also using similar analyses to help them determine how best to keep customers hooked so that they come back day after day or night after night. One thing is for sure, unless you are the owner of a gaming company, the odds are always going to be stacked against you.

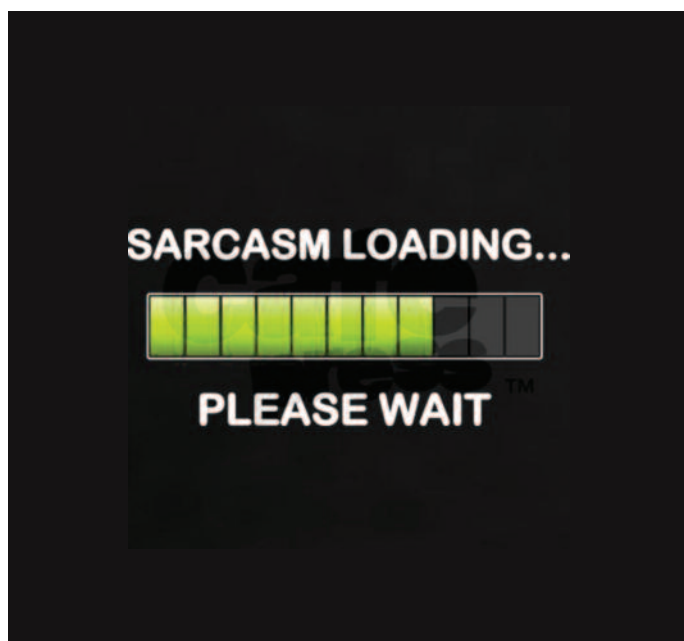
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'Featurespace analyses this information and builds up a picture of what is 'normal' for any given individual, and what would constitute erratic or uncharacteristically risky behaviour that might indicate gambling addiction.'

MOI?

NIGEL CUMMINGS

Users of social media who post sarcastic remarks should be aware that machine aided analysis of their remarks could land them in hot water!



How often have you been tempted to post a sarcastic remark on Twitter or Facebook when faced with long delays, for example, when flights or trains you have been waiting to board are cancelled or delayed? Many of us do it seems, and so often an innocent tweet to let off a little steam, such as 'Thank you X for making me late' may be all that is needed for authorities using sarcasm analysis to classify you as a troublemaker.

French company Spotter has developed an analytics tool that it claims has the ability to identify sarcastic comments posted online with something like an 80% level of accuracy. What is even more

worrying is the fact that Spotter says its clients includes the Home Office, EU Commission and Dubai Courts.

Spotter is apparently using algorithm-based analytics software to generate reputation reports based on social and traditional media material inputs. The company's proprietary sarcasm detection software uses a combination of linguistics, semantics and heuristics to create algorithms that generate reports about online reputation. It says it is able to identify sentiment with up to an 80% accuracy rate. (For those who doubt the power of analytics, the company says these reports can also be verified by human analysts.)

Spotter's sarcasm detection algorithms have apparently been developed to reflect various tones in 29 different languages including Chinese, Russian and Arabic. The system employed is fully automated, yet judged to be quite accurate. One of the most common subjects for sarcasm was bad service - such as delayed journeys. One of Spotter's clients is Air France who may be using it to detect dissatisfaction with their service or people who may be putting potential customers off.

To look for and analyse who is being sarcastic, Spotter charges its clients a minimum of £1,000 per month for its services. Human effort is still required to further analyse the outputs from Spotter's automated sarcasm detection systems although Spotter is working on that. Regarding this continuous development, Spotter's UK sales director Richard May recently said: 'Nothing is fool-proof - we are talking about automated systems. But five years ago, you couldn't get this level of accuracy - we were at the 50% mark.'

<OR>

JOIN OUR ANALYTICS NETWORK
Visit: www.analytics-network.com

CRYSTAL BALLS AND SILVER BULLETS

NIGEL CUMMINGS

Detlef Nauck, visiting Senior Lecturer at the Otto-von-Guericke University of Magdeburg and Chief Research Scientist and Technical Group Leader in BT's Intelligent Systems Research Centre, recently presented a paper at our London Analytics conference. The subject of his presentation centred on proactive service.



Extracting useful data was the biggest challenge when dealing with big data. Analytics also did not provide a magical silver bullet to address this challenge, but there were many types of analytics and it was important to be able to differentiate which particular type to use.

Automation of analytics is an important area. IBM have coined the term 'autonomics' to describe a system which could be self-learning and so self-aware that it could change the way it interacted with its environment based on past experiences.

Autonomics was an area where BT had shown great interest, not just in working with networks, but also in business processes and other areas. The ability to automate operations to some degree or another provides benefit for any company that has a large customer base, such as BT.

These systems, even when autonomous are there to assist decision support and not replace the human component of the decision making process. It was therefore essential that automated systems worked

correctly and provided exactly the information required to assist with the decision making process.

Predictive analytics can be useful when dealing with data held in large organisations with many customers like BT but managers have to be educated in how to interpret them and how to make best use of them. Managers, like engineers, only understand exact integers. Give them a range or confidence interval and the chances are they will demand to know which one it will be. They also do not seem to understand that predicting the future is not an exact science and are likely to blame analytics if the future is not exactly as predicted.

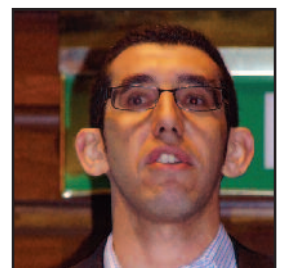
Detlef Nauck also spoke about the use of 'process mining', a system whereby data from previous maintenance operations could be analysed to further refine predictions. Process mining can identify where a process has gone wrong and then help you figure out why.

<OR>

HAVE ANALYTICS, WILL TRAVEL

NIGEL CUMMINGS

Aaron Sugarman, an O.R. man with a considerable talent for analytics, explained at our recent Analytics Conference in London, how analytics can add value to business.



Aaron is the Head of Commercial Analytics and Pricing Insight at TUI Travel in Luton. His team uses mathematical techniques to find working models and solutions to various organisational problems within the company. There are few people better qualified to comment on how the application of O.R. and analytics can add value to business.

Currently he spearheads the development of automated yield systems which dynamically manage the prices of up to ten million holidays; responding to fluctuations in demand, capacity and costs in order to maximise margin. He is an expert on yield management at TUI but he never loses sight of the fact that the mission of his company is to provide travel experiences which are special. 'We don't just fly you there, we are all about managing the experience that you have all the way from beginning to end and we take very seriously, the fact that customers spend the most important two weeks of the year with us.'

He emphasised in his talk, how important from a yield management perspective it was, to identify specific kinds of experiences to help

tailor holidays to suit his company's clients, and to focus on the provision of differentiated and exclusive products. Examples might include cabin layout (one class or two) and whether transfers by taxi (both, of course, at a premium).

The customer analytics team makes extensive use of customer data to target offers and provide customer insight for product development. Web analytics is used extensively to optimise the website in terms of the customer experience online and to target customers with the right products and offers.

By employing analytics in this way TUI is able to maximise its profits and maximise customer retention. By ensuring high levels of customer satisfaction, customers returned time and time again to make bookings, and TUI's extensive use of analytics becomes fully justified as a result.

<OR>

WE'RE JUST GOOD FRIENDS

NIGEL CUMMINGS

According to John Hopes, OR Society Vice President and Partner, Valuations and Business Modelling, Ernst & Young LLP, 'Analytics and Operational Research can work together to provide better solutions to a wide range of problems posed by our modern world'.



At our analytics conference, June 2013, London, John Hopes presented his personal view of how Operational Research and Analytics can be used in combination. The two are closely related but whilst analytics is relatively new, O.R. has been around some 75 years and has proven its worth in delivering insight from data; it is as such a great resource that the analytics community could draw upon.

O.R. can add value to analytics at the predictive level. Combining analysis from the two disciplines could lead to far more accurate forecasting particularly using such [O.R.] methods as simulation and modelling for example, where many valuable tools have been developed.

O.R. has had a long history in deriving insight from data. There are two sides to O.R., the soft side and the hard - hard tended to be about quantification, whilst soft tended to be more about adding some form of structure to understand problem complexity. (See also 'Hard OR Soft', *ibid.*)

O.R. has tended to work with relatively small amounts of data mainly

because the vast quantities that are now referred to as 'big data' were simply not available and, until relatively recently, there was insufficient computing power to be able to handle it.

Mr Hopes said that O.R. people and data scientists who utilised analytics techniques were very much alike, they were, 'Super men really, because they had to be mathematicians, statisticians, and analysts'. Some of the challenges they faced were to make a connection between granularity of the problems they examine and the needs of the client who enlisted problem-solving capabilities.

He also said, 'Analytics and big data do continue to be big issues for business and government. O.R. does add value to analytics and has this great track record that is a resource for analytics. Analytics and big data incorporate O.R. and provide great opportunities for O.R. practitioners and I believe this provides new avenues for research.'

(One could say, 'The future is bright; the future is ORAN', ed)

<OR>

GOAL!

NIGEL CUMMINGS

Speaking at our analytics conference, which was held in London in June this year, Sanjit Atwal spoke about the company he set up for football fans.



He introduced himself as CEO and co-founder of Squawka, a 'second screen' web application for football. Squawka he said was able to provide 'real-time' access to statistics on every player on the pitch alongside social interaction with other fans. It can enhance a fan's viewing experience with intelligence that, to date, had only been available to the professionals - comprehensive match statistics at the click of a button.

For fans who miss the joys of having their viewing interrupted by advertisements, Squawka can give you the thrill of being able to watch the adverts throughout the whole match so you no longer have to wait until half time or while a goal is about to be scored!

In addition to providing comprehensive statistics, the app could also enhance advertising value and assist revenue generation for its advertising partners. Companies wishing to advertise via Squawka could opt to change the messages they wished to present to their audience depending on the time of the game and the events on the pitch.

Sanjit Atwal claimed that Squawka was so powerful because it was, 'Powered by a comprehensive player rating algorithm built on the back of extensive analysis of over 400 Premier league matches'.

The analysis that made Squawka so successful encompassed over 14 million data points - action events, deployment, outcomes, player position and pitch area. The performance score could also be filtered by Defence, Attack or Possession. It could even be used to assist correlating player performance value with a players transfer/wage value.

Sanjit Atwal's dynamic presentation concerning his company's Squawka application can be seen in full from the OR Society website, by the time you read this article a video of his presentation should be available for OR Society members to stream or download to computer, tablet or smartphone.

<OR>



WHERE THERE'S DATA, THERE'S BRASS!

NIGEL CUMMINGS

Colin Shearer, data mining pioneer and Vice-President of Customer Analytics at IBM presented his view of how analytics delivers value at our recent Developments in Analytics and Big data conference.



Colin Shearer

The world we now live in is apparently instrumented, interconnected and intelligent. He used the term instrumented to describe 'lots of things that are out there generating data: people, devices and systems'. All of these data generators are connected to each other and creating opportunities to develop more intelligent systems. Mr Shearer claims that this is making the planet 'smarter'.

This intelligent world is of course generating huge amounts of data that can be categorised, he said, by three Vs: the **volume** (increasing exponentially), the **variety** of data and the **velocity** at which that data is hitting us. A survey by IBM has revealed that one in three managers knew they were making critical decisions without having the right information. (It would be interesting to know how many of the other two thirds made decisions without knowing they did not have the right information or did they simply not make any decisions! ed.) Half of them had problems getting the data as efficiently as they wanted. And only three quarters of them thought they could do their job better if the data provided them with foresight as well as insight. Mr Shearer claimed, 'That is why there is an unprecedented demand for this area of predictive and advanced analytics'.

Predictive analytics he said commenced with the data mining boom of the 1990s when there was a fixation on algorithms and technology, but a little while later, everyone started to want the 'next big thing', the 'silver bullet', but there was no silver bullet. What was needed was not a better tool but a better understanding of what was being analysed and how to extract information therefrom.

The application of analytics to this huge pool of data is capable of gaining deeper insights into behaviours and making more accurate predictions. However, it is not until you actually put it to use that it starts to add value.

The other component was to consider how to add the 'whole idea of automation and industrialisation' to data collection and analysis. Mr Shearer believed that it would be possible to build models that are able to improve their capabilities based on their analysis of the data they have been designed to process presumably with a view to removing any need for humans. (Thus achieving a smart planet since the biggest threat to it is from humans. ed)

It was clear from Colin Shearer' presentation that analytics whilst very much the 'flavour' at this time still had considerable mileage to go before the 'next big thing' came along!

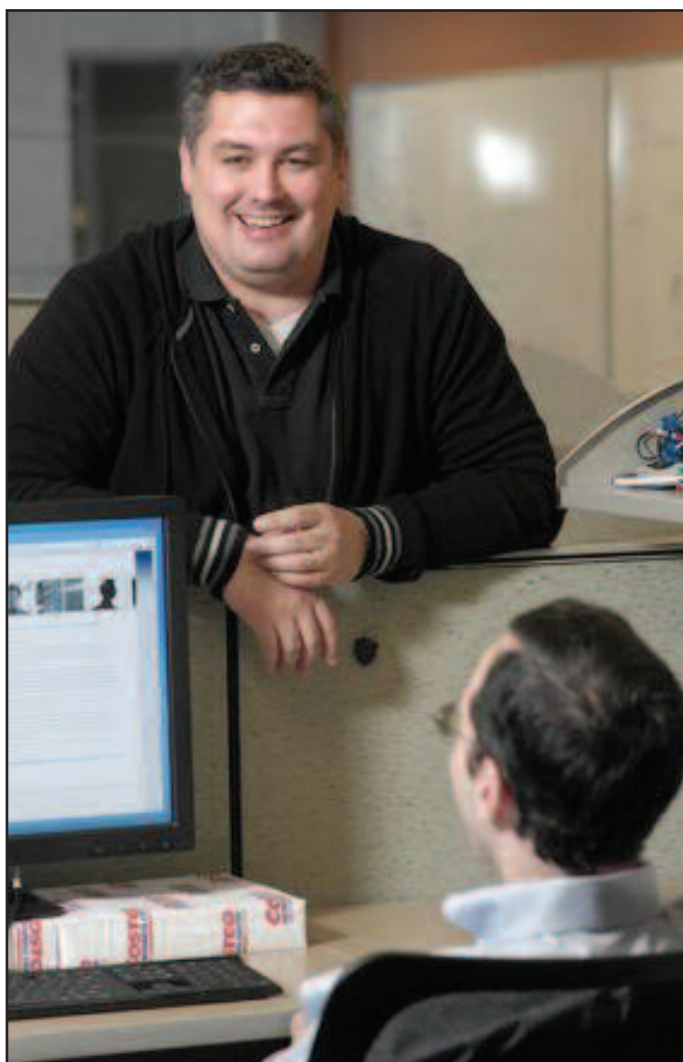
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'A survey by IBM has revealed that one in three managers knew they were making critical decisions without having the right information.'

THE BEST THING SINCE...

NIGEL CUMMINGS

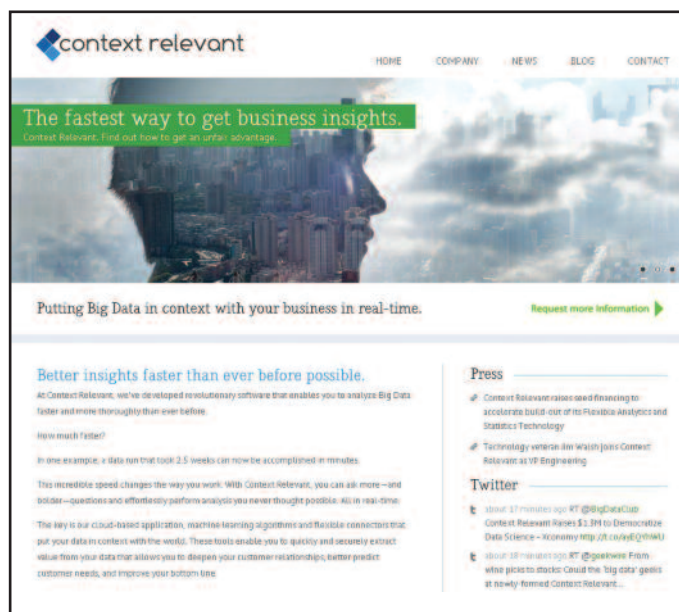
A new tool for the analytics tool kit has arrived. Context Relevant is a company which offers the tool, and it is aimed at data scientists and the organisations that operate in analytics environments.



Context Relevant's CEO -Stephen Purpura

Context Relevant is a start-up company run by CEO Stephen Purpura, a data scientist from Seattle. Its analytic application was developed as a result of cooperation and funding from Madrona Venture Group, Vulcan Capital, Bloomberg Beta, Geoff Entress, and other private investors.

While being essentially a new business in the analytics field, Context Relevant is nevertheless capable of adding three analytics solutions to the rapidly growing behavioural analytics library – banking and finance, web context personalisation, and online



Context Relevant Screen

travel. The bank and finance offering examines statistical relationships within customer transaction histories, CRM data and data feeds and compares this with current financial markets to unearth business opportunity.

The Web content tool is said to allow organisations that employ it to determine each visitor's preferences to its websites and recommend content accordingly. This kind of real-time automated analytics could prove extremely profitable for the travel industry, which derives considerable revenue from online operations. Indeed, the online travel solution apparently helps in the selection of customer choices that are tailored to each potential customer based on their online activity and current external data regarding travel trends, hotel rooms, and ratings.

For more information email BigData@contextrelevant.com or visit www.contextrelevant.com.

REGIONAL SOCIETIES

MIDLAND (MORS)

CONTACT: Jen East (Secretary)

EMAIL: MidlandsORSociety@live.co.uk

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

Date/Time: Wednesday, 09 October 2013 at 18.00

Venue: Aston University

Speaker: Jane Parkin, Independent O.R. Consultant

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

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

Date/Time: Tuesday, 12 November 2013 at 18.00

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

Speaker: Noel-Ann Bradshaw, University of Greenwich

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

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.

TEL: 029 2087 5524 Fax: 029 2087 4199

EMAIL: ThompsonJMI@cardiff.ac.uk

SWORDS meeting

Cybersecurity: Be Prepared

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

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

Speakers: Meirion Morgan

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

Dr. Meirion Morgan

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

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

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

For further information contact Jonathan Thompson Tel: 029-20875524

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: James Crosbie

TEL: 07891244594

EMAIL: jamescrosbie@hotmail.co.uk

YHORG meeting

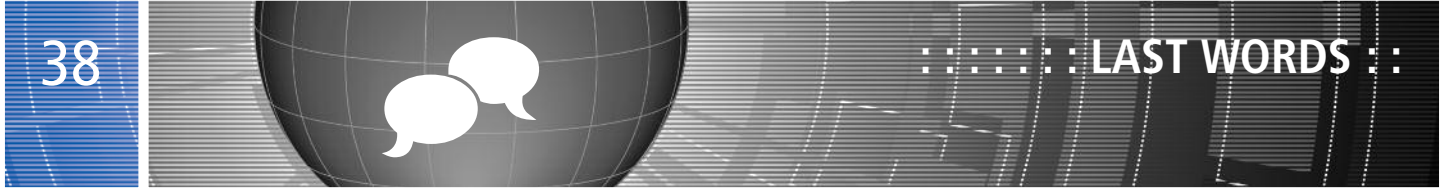
Date/Time: Wednesday, 16 October 2013 – 14.00-18.00

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

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

Title: Introduction to Operational Research 2-3pm

Speaker: Louise Orpin, The OR Society



OR-30

John Crocker

In 1983, the Chairman of Cadbury Schweppes was Sir Adrian Cadbury who was Chairman from 1965 until 1989. The company, founded by his ancestor John Cadbury in 1824 was sold to Kraft Foods in 2010 for £11.5bn according to academia's 'favourite' reference site Wikipedia.

Sir Adrian gave the Blackett Memorial Lecture and his talk was entitled 'Work and the Future'. By way of introduction he noted that for O.R. to be effective it was first necessary to have a correct definition of the problems. He also noted that O.R. was often used to optimize the way a particular function is carried out but that the real question should have been whether that function was, in fact, necessary.

By 1983, Britain's economy was rapidly changing from manufacturing to services. Unemployment was running high mainly as a result of the loss of manufacturing jobs, jobs which would never be replaced. It was argued that we made the mistake of winning the War (indeed, two world wars) but the rot had set in as early as 1851 when the USA and Germany issued a warning to us at the Great Exhibition.

Although there are many excuses and many reasons for our decline, Sir Adrian considered three areas to be the main culprits: social attitudes (industry was something the lower classes indulged in); education (The Greats are not the sciences or even mathematics but ancient Greece, Rome, Greek, Latin and philosophy) and the divisions within our society ('I know my place'). In 1908 Germany had 10 technical universities doing 'Technik' for 14,000 students. In

Britain, the best students were being educated to rule the Empire, certainly not to run industry. The emphasis was on administration not innovation – playing by the rules.

I shall close by re-printing Sir Adrian's final paragraph in full and to recommend you take the time to read the whole paper. I apologise to all the other authors who had their papers published in September 1983

'What is required is to encourage more people to start new, small businesses and move people to work for themselves. Only then can Britain compete effectively in world markets because the slower the world economy grows, the quicker on their feet successful businesses will have to be. Only then can we release the creative talents which are there but are frustrated by the ponderosity of the organizations in which they are employed. If we can succeed in introducing more movement in every sense into the fabric of our society, there will not just be work available for those who seek it, but they will be more likely to find it on their own terms and so be able to fit their work into their lives rather than the other way round.'

If we invited Sir Adrian Cadbury to come back to give this year's Blackett Memorial Lecture, how much of his 1983 presentation would he have to change?

Cadbury, Sir Adrian, (1983), *Work and the Future*, *JORS* 34.9, pp837-843, (jors1983180a.pdf)

<OR>

OR-20

Can O.R. help determine the value of schools?

The organising committee of the Operational Research Society Local Government Study Group decided in September of last year that the assessment of value added at schools was becoming more prominent as an issue and that Operational Research community had important contributions to make in this field. It was therefore decided to bring together staff from local education authorities and operational researchers to discuss the issues involved. This led a seminar organised jointly by LEARG and the Local Government Study Group of the OR Society, which covered the broad issues of assessing school effectiveness and value added.

Mixing and Talking

The University of Warwick provided an excellent venue for the seminar at the postgraduate centre at Radcliffe House. The open plan coffee lounge was an ideal environment to get people mixing and talking. The amphitheatre lecture room was good for this sort of seminar.

There were over 90 attendees, mostly from LEAs, although the DFE and academic institutions were also represented.

The morning session was chaired by Nigel Hill, from Hampshire LEA, representing LEARG. After introductions, the first speaker was Professor John Gray, from the University of Sheffield who spoke about issues of school effectiveness. He presented a model to measure value added at schools which relied on the relationship between prior achievement of a pupil and their current achievement.

Enlightened or blinded?

Dr Emmanuel Thanassoulis of the University of Warwick enlightened some and blinded others with a technical look at Data Envelopment Analysis as it could be applied to education. The key difference of this technique is that it allows multiple educational outcomes to be related to multiple input factors and for targets to be identified for schools which reflect best observed practice.

Peter Smith from York University took us into the arena of political science, drawing on materials from the fields of soviet studies and management theory to examine the practical implementation of performance indicator systems in general. A fascinating session for those of us that are too often looking at the narrower problems rather than the bigger picture.

Accountability to taxpayer

After lunch, Emmanuel Thanassoulis took the chair on behalf of the OR Society. James Kennedy from the Audit Commission put the league table into context of accountability to the tax-payer and information for pupils and parents. The pressure for developing value added analysis as a real reflection of school achievement is considerable.

Ian MacCallum from the London Research Centre explained some of his analyses of 1981 Census data with the 1991 Key stage 1 SATS results for LEAs. Looking at the range of indicators from the Census he drew some conclusions which were of interest, but perhaps not startling. Indeed, the case pointed to the effects of socio-economic factors on achievement, bearing out the results of other research. Questions were raised on the adequacy of Census data to reflect smaller populations, and that direct data collected from schools will always be better than indirect proxy variables from the Census.

Need for consultation

The final speaker was Keith Wood-Allum, Director of Education for Leicestershire, who gave a detailed case study of the work in the

LEA. He stressed the need to approach the exercise with full consultation with head teachers and to understand the sensitivity of the issues, along with all the positive aspects of the information that a good school can use in its daily management and planning. Careful implementation was the secret of success.

Useful forum

The seminar proved a useful forum for the interchange of ideas between operational researchers and those working in the management of local education. It stimulated discussion and requests for a follow up workshop have been made. The seminar probably raised more questions than it answered, but certainly showed that LEAs across the country are making use of these techniques, and that more are interested in starting to use the approach for the benefit of schools and their pupils. However, it also showed that there are no agreed solutions to the best way of developing the methods as a national system and that there is scope here for further work.

Further details

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Central London

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West London

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

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