THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

OCTOBER 2012 NO 502

IMAGE ANALYSIS CREATES CITY IMAGES

: : INSIDE THIS MONTH : : : : :

THE OR SOCIETY

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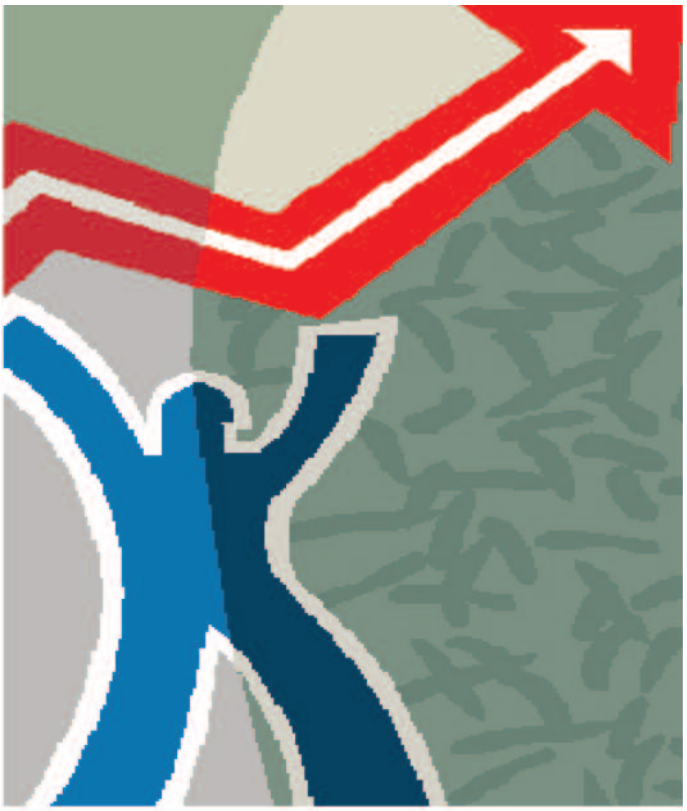


ADVANCE YOUR CAREER PROSPECTS

Accreditation: What it is and why you should apply

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

There are three categories of accredited membership:

Fellow (FORS) - for high achievers with at least ten years' experience
Associate Fellow (AFORS) - for those with a successful track record over at least five years
Associate (AORS) - for suitably qualified recent entrants
Candidate Associate (CandORS) - for those either completing a degree with a substantial O.R. content or starting their first employment in O.R. Candidate Associates are appointed a mentor to help guide them through the first couple of years in their O.R. career.

The substantial benefits of this recognised professional achievement include:

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

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

EDITORIAL

JOHN CROCKER

This month Jeff Griffiths, Chairman, Publications Committee discusses the implications of Willetts' speech, the Finch Report and Open Access with particular reference to how these may impact the OR society.

It has been noted that the OR Society could survive financially without its members but not without its publications so if OA could jeopardise this then we need to take it very seriously.

Talking of *Jeopardy!,* six months ago Nigel Cummings reported that 'Watson', IBM's super computer (named after the founder of IBM, not Sherlock Holmes' sidekick) had beaten a number of champions at this very popular US quiz/game show. Apparently, Jonathon Batson also made reference to this at our Analytics event in April (if you were not there, make a note in your diary for next year, if you were there then no doubt you have already done so). Rather than playing games, Watson is now being turned to become a Doctors' Assistant in the guise as a diagnostician and potential prescriber of treatments (see 'Can Watson become a Doctor?' *ibid.*). Maybe, it will also be used to help detect fraud by combining 'link analysis' with 'predictive analytics' (*ibid*).

On the question of fraud, it was interesting to read in the *Sunday Times* (12/08/2012) that plagiarism, fabrication and falsification were of major concern to the editor of the *British Medical Journal,* Dr Fiona Godlee. Although plagiarism is something we have discussed as being a problem with papers submitted to our journals, I am not sure either falsification or fabrication have, as yet, been spotted but, both are potentials for an analytical approach similar to that of detecting fraud so maybe someone in the O.R. world will take this up soon.

The life and times of Sir Henry Tizard was intended to be brief and to run to no more than 3 parts. Douglas Adams described *The Hitch-Hikers Guide to the Galaxy* as a trilogy in 5 parts, there is a distinct danger that this series may become a trilogy in six parts but most definitely not a 'sexology'. Part 4 covering probably Tizard's most exciting and influential time appears elsewhere in this issue.

Also, we have the first of the articles to emanate from this year's Conference (OR54) held in Edinburgh. Following the debate in one of the plenary sessions, we have identified the need for a regular feature along the lines of O.R. minus 20 and minus 30 which rather looking to the distance past will take the last quarter as its theme. The intention is to make a very select group of recently published papers more accessible to a wider audience. John Lamb, University of Aberdeen has taken up the challenge, many thanks, John.

If you have any strong views on *OR Insight* and how it might better meet the needs of the OR Society members but have not been targeted in the recent survey then please let us know as soon as possible.

Don't forget the Open Day and in November there is the Blackett Lecture named after Lord Blackett, another member of the Tizard Committee – book now or you may be disappointed.

<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.

Edward J Hagger	London	Faith E Benjamin	USA
David Crawford	London		

AI SAVES FARMERS MILLIONS IN PEST CONTROL

NIGEL CUMMINGS

An artificially intelligent software-based monitoring system could help control exotic crop pests and save farmers around the world billions.

Californian farmers are currently facing a dire threat, infestation by oriental fruit flies. Agriculture officials have tried to keep these under control by laying traps and spreading insecticide after 13 of the insects were spotted in the state. Thirteen may not seem a great number, but these insects can multiply at an alarming rate. Thus Californian pest control officials issued an emergency state-wide alert on 8th August this year, and the next step is a lockdown of huge stretches of farmland in a crippling quarantine.

This is no overreaction. The oriental fruit fly, Bactrocera dorsalis, is among the most feared insects in agriculture, responsible for crop losses that can run into billions of dollars. Europe too could be affected as Bactrocera dorsalis is extremely vigorous and capable of surviving under a wide range of climate conditions.

This pest is known to infest 230 crop species, with the larvae that hatch in the fruits leaving them rotting. According to Gary Steck, an entomologist at Florida's Department of Agriculture, 'They are one of the world's worst fruit and vegetable pests because of their rapid breeding, broad range of host plants and invasive abilities.'

Now a system utilising machine learning technologies developed in Taiwan, where the pest is endemic, aims to harness artificial intelligence to warn of imminent outbreaks, limiting the need for such drastic action. In Taiwan, fruit fly populations are normally monitored using traps that are manually checked every 10 days.

Cheng-Long Chuang and colleagues at the National Taiwan University in Taipei wanted to automate the counting process, so they placed infrared beams in the traps. Each trap records when the beam is broken, indicating that an oriental fruit fly has entered, attracted by a chemical designed to lure the insect. The results collected are sent via radio to a local station every 30 minutes, allowing real-time measurements of the population.

Part-funded by the Taiwanese government, the team have so far set up 240 traps on fruit farms around the country. Machine learning algorithms pool the continuous data arriving from each of these traps and predict when the local fruit fly population is about to explode.

To help in this prediction, the traps are also fitted with weather sensors that monitor temperature, humidity, wind speed and rainfall. Fruit fly population surges tend to match changes in weather - when it is humid for example, the level of insects generally rises.

In Taiwan's current system, a red alert is issued when the number of flies caught in a trap surges beyond 1024 in a 10-day period. But the AI system can learn what counts as a normal level of fruit flies in an area and adapt its warnings on the basis of the current weather and time of year. It can also work out where the pest is likely to be breeding.

When a potentially devastating infestation is predicted, it automatically sends a text message to government officials' cell phones, providing the time, location and severity of the potential outbreak. The warning should in theory allow authorities to take pre-emptive measures to limit the possibility of outbreak by putting down insecticide.

Tested on historical data taken from the network of traps, the Korean AI system has proved to be 88% accurate in predicting an outbreak. Whilst good for Korean farmers, the system will undoubtedly benefit farmers around the world. Its accurate prediction levels will enable commercial farmers (as opposed to subsistence farmers) know the real-time status of their fruit farms without physically being there. Also, it can reduce some of the production costs associated with fruit farming by avoiding unnecessary pesticide spreading.

The oriental fruit fly lives mainly in south-east Asia, but it is also seen in Hawaii, California and Florida, usually carried in on fruit that is illegally imported. Europe is vulnerable too as the effects of climate change play out; the pest is expected to expand its colonies to new ground into higher latitudes as temperatures rise.

WANT TO ATTEND YOUNGOR18 FOR FREE?

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

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

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

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

To apply please send an extended abstract of the paper which the author(s) intend to present at the conference. You also need to supply the names and contact details of two independent referees, one a member of the Operational Research Society, the other a client unless inappropriate, who are in a position to testify as to the accuracy of the submission and the fact that the work described was done by the candidate(s). A detailed curriculum vitae is required for each candidate, and in the case of multiple authorship of a submitted paper, the submission must also include a statement detailing the contribution that each author has made to the work described. Submissions should be sent by email to Gavin Blackett, Secretary & General Manager of the Society, email gavin.blackett@theorsociety.com. The closing date is 31st December 2012.

<OR>

HOW HARD IS HARD?

JOHN CROCKER

A problem is classified as 'P' (or P-hard) if it can be solved quickly.

There is another group which have the property that if one is given the solution then one can quickly verify that the answer is true or false. This group is known as 'NP' (or NP-hard). Note, if one can solve a problem quickly then one can verify the solution quickly so a P-hard problem is also an NP-hard problem. The literary million dollar question is whether the reverse is true; can all problems whose solutions can be verified quickly also be solved quickly? The Cray Foundation offered one million dollars in 2000 to the first person to prove this one way or the other – so far there have been no takers. At the risk of confusing you, there is a third category called NP-complete – these are the key to 'life, the universe and everything'.

Many eminent mathematicians have tried to find the algorithm which will turn an NP problem into a P problem, some have even lost wagers over how long it would take to find such an algorithm and others have put up prizes for the first proof or counter-proof. There is a very interesting article in *Scientific American* by John Pavlus (Vol 307.3 – September 2012) explaining the problem and its history along with some of the off-shoot benefits.

At OR54, this year's annual conference held 4-6 September in Edinburgh, NP hard problems were very much in evidence. One of

'can all problems whose solutions can be verified quickly also be solved quickly?'

the papers was given by Guido Diepen who has used a constraint programming approach to the problem which is apparently particularly good at solving Sudoku type problems. Not only does it do so quickly, provided there is a feasible solution, it does so in a way which makes it relatively easy for the user to describe in terms of the constraints. An example is that one can simply state that all values in row j have to be different (for rows j = 1, 9) similarly for columns and for the 3x3 boxes. These constraints require quite of a lot of coding to achieve the same in a linear or integer programming model. Although this approach greatly simplifies the problem in terms of setting up the constraints, it still uses an heuristic approach so does not reduce the problem from NP to P.

<OR>

PRACTICAL PROCESS IMPROVEMENT USING LEAN AND SIX SIGMA

IAN SEATH, IMPROVEMENT SKILLS CONSULTING LTD.

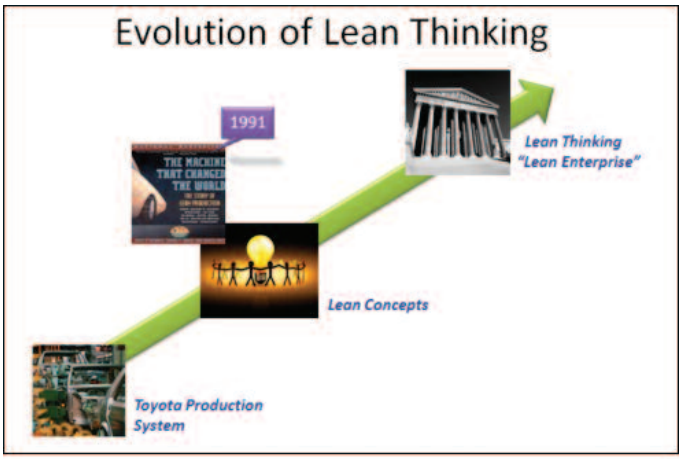
There are many different approaches that organisations can use for process improvement and among the most commonly used are Lean and Six Sigma.

They both focus on identifying customers' requirements and ensuring business processes can meet those requirements in the most value-adding way. While the biggest benefits might be achieved by adopting Lean or Six Sigma organisation-wide, there are plenty of opportunities to apply the principles and tools at a more local, tactical level.

Line managers and internal consultants who want to understand how to improve and manage business processes to reduce waste, improve effectiveness and reduce cycle-time should book a place on this one-day practical workshop which covers the following topics:

- How Lean and 6-Sigma differ, yet are complementary approaches for process improvement
- How to set-up and define a process improvement project
- How to use appropriate tools to map, measure and analyse business processes
- How to design a Lean, value-adding process
- How to engage key stakeholders and staff to ensure effective management of process change

A case study is used to provide attendees with the opportunity to work through an end-to-end process improvement project.



Last year's course achieved an average delegate feedback score of 9.38 out of 10. If you want to cut through the jargon of Lean and Six Sigma and learn some practical tools, this is the workshop for you.

Practical Process Improvement using Lean and Six Sigma is running at the OR Society's offices in Birmingham on November 5th 2012 contact jennie.phelps@theorsociety.com for more details or to book on the course.

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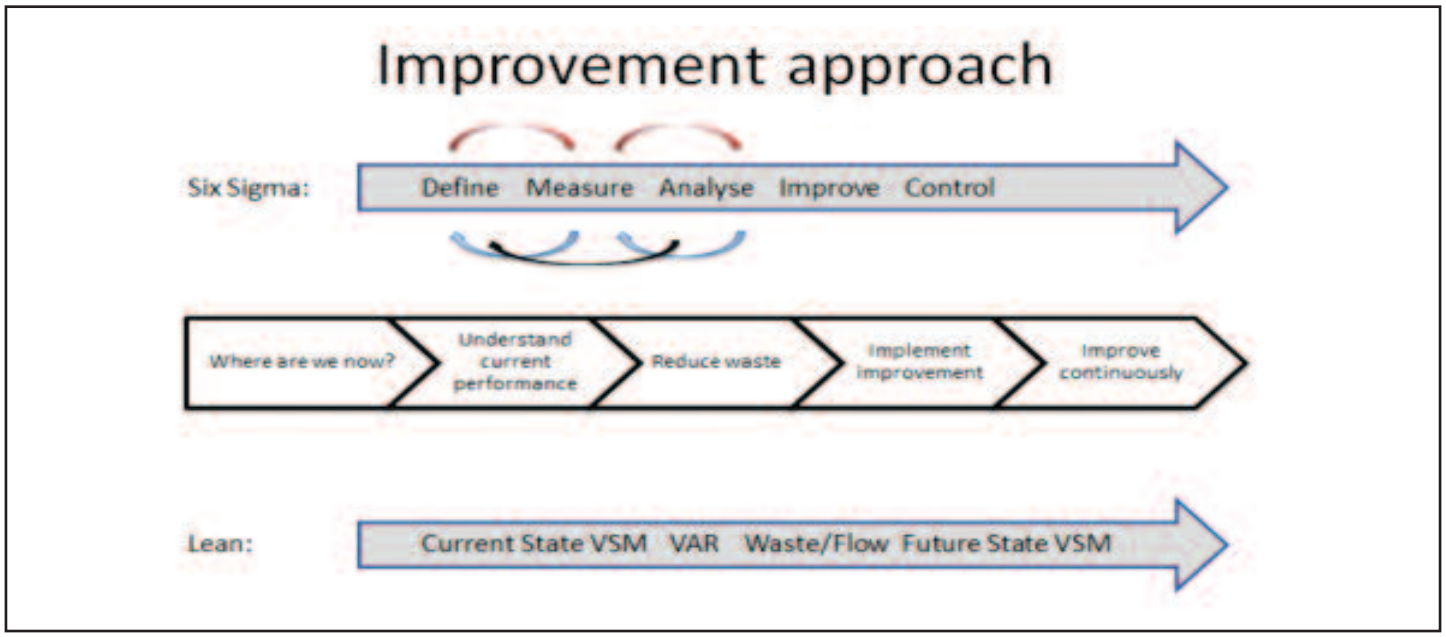


CONFERENCE NEWS

EVENT:	Careers Open Day	**DATE:**	21 November 2012	**VENUE:**	Nottingham Conference Centre
EVENT:	Blackett Lecture	**DATE:**	29 November 2012	**VENUE:**	The Royal Society, London
EVENT:	YOR18 Conference	**DATE:**	9 – 11 April 2013	**VENUE:**	University of Exeter
EVENT:	KIM2013 Conference	**DATE:**	4 – 5 June 2013	**VENUE:**	Forest of Arden Hotel, nr Coventry
EVENT:	IMS105 2013	**DATE:**	3 - 4 July 2013	**VENUE:**	University of Salford
EVENT:	OR55 Annual Conference	**DATE:**	3 – 5 September 2013	**VENUE:**	University of Exeter

COULD 'WATSON' BECOME A DOCTOR?

JOHN CROCKER

Jim Giles writes in *NewScientist* (No 2879, p 19) that IBM's *Jeopardy!* winning super computer (see IOR April 2012) is being turned into a diagnostician.

Using similar logic that enabled it to beat the experts at the popular US quiz show the good people at IBM are working with several US hospitals and cancer centres to produce what is described as a 'virtual physicians' assistant'. This is nothing particularly new – I seem to recall similar exercises many years ago that claimed to be able to diagnose a whole host of illnesses (or, at least, rank the possible causes of the given symptoms in descending order of probability). Things have, however been quiet for some time on this front so suspect these earlier attempts were maybe not quite as beneficial as the hyperbole surrounding them suggested.

At the first trials of Watson, it was only able to score a lowly 50% but as a first attempt, this was considered quite promising. It was set the questions from *Doctor's Dilemma*, a competition for trainee doctors that takes place at the annual meeting of the American College of Physicians. The computer was set 188 questions it had not seen previously. (It doesn't say what form this test takes – multi-choice or open.)

Where Watson will be able to gain on the trainees, however, is in the amount of past data it is able to absorb and analyse. At the moment it is being fed with 'tens of thousands [of records] at Sloan-Kettering alone – of treatments and outcomes associated with individual patients.' Giles goes on to say that when given a new patient, it looks for matches with past patients with similar symptoms and treatments that have been most successful.

The aim is that eventually it will be able to give doctor's a prioritised list of possible causes along with suggested treatments that will take into account such factors as drug interactions and patient's medical history.

The big advantage of this is that Watson will be able to absorb data from all sources almost instantly so maintain a very up-to-date knowledge of current developments as reported throughout the world – something human doctors are finding every-increasingly difficult to do. This is especially true in the area of oncology where developments are taking place rapidly across such a wide area of research particularly in genomics and microbiology.

A spokesperson from WellPoint, Cindy Wakefield says that progress is good and what takes a couple of days to get a result now only takes a few minutes. She believes it could be deployed as early as next year.

<OR>

BOOKS FOR REVIEW

If you would like to review a book, please contact Jim Chilcott at:
JORS-bookreviews@sheffield .ac.uk

Economic Time Series - Modeling and Seasonality
William R Bell, Scott H Holan, Tucker S McElroy (Eds)

Handbook on Semidefinate, Conic and Polynomial Optimization
Miguel F Anjos & Jean B Lasserre (Eds)

Modeling Dynamic Economic Systems 2nd Edition
Matthias Ruth & Bruce Hannon

Multilevel and Longitudinal Modeling Using State - Volume I: Continuous Responses and Volume II: Categorical Responses, Counts, and Survival 3rd Edition
Sophia Rabe-Hesketh & Anders Skrondal

Stochastic Optimization Methods in Finance and Energy - new financial products and energy market strategies
Marida Bertocci, Giorgio Consigli, Michael A H Dempster (Eds)

An Introduction to Exotic Option Pricing
Peter Buchen

Applied Operation Research with SAS
Ali Emrouznejad

Option Valuation: A First Course in Financial Mathematics
Hugo D Junghenn

Quantitative Problem Solving Methods in the Airline Industry - A Modelling Methodology Handbook
Cynthia Barnhart, Barry Smith (Editors)

<OR>

THE OR SOCIETY

Blackett Memorial Lecture

The Society is pleased to announce that the 2012 Blackett Memorial Lecture will be given by

Prof. David MacKay FRS

Professor of Natural Philosophy in the Department of Physics at the University of Cambridge and Chief Scientific Adviser to the UK Department of Energy and Climate Change (DECC)

The title of the lecture is:

2050 Pathways

- How easy is it to get off our fossil fuel habit?
- How does our current energy consumption compare with our sustainable energy options?
- How can we make energy plans that add up?

This talk will offer a straight-talking assessment of the numbers, and will present the DECC 2050 Pathways Calculator [http://tinyurl.com/2050decc].

David MacKay is a Professor in the Department of Physics at the University of Cambridge. His best-selling book, *Sustainable Energy - without the hot air* (www.withouthotair.com), has been described as 'a tour de force' *(The Economist)*, 'a must-read analysis' *(Science Magazine)*, and 'this year's must-read book' *(The Guardian)*. In 2009, he was appointed the Chief Scientific Advisor to the UK Department of Energy and Climate Change.

Thursday 29 November 2012

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/Pages/Conferences/Blackett.aspx and fill in the online reservation form.

If you have any queries contact **hilary.wilkes@theorsociety.com**

OBITUARY: PROFESSOR DOUGLAS JOHN WHITE 31 OCTOBER 1933-27 JULY 2012

NORMAN LAURIE, BILL SCHERER, LYN THOMAS

Doug White was one of the founding fathers of O.R. in academia in the UK as well as developing an international research reputation in decision theory, particularly multi-objective decision making and sequential decision making based around dynamic programming.

He was awarded the Beale Medal of the Operational Research Society in 1993 for the body of his work in this area and was made a Companion of the OR Society in 2001.

After obtaining a Mathematics degree from the University of Oxford, he joined the group at Birmingham University which was the first academic course in O.R. in the world in the early 1950s. He then set up from scratch two very different types of O.R. departments in the UK – in Strathclyde University and Manchester University respectively. Finally he moved to the US where he used his personal skills as well as his research reputation to lead forward a prestigious Industrial Engineering faculty at the University of Virginia which was suffering from internal strife.

In the rest of this obituary Prof Norman Lawrie will discuss Doug's time at Strathclyde. Prof Lyn Thomas will discuss his developments in Manchester and Prof Bill Scherer will describe his time at Virginia.

Doug White joined the University of Strathclyde as a Reader in Operational Research in 1964, the same year in which Strathclyde became a university. It had been founded in 1796 as Anderson's Institution, was latterly the Royal College of Science and Technology before its transition to University status. It had been funded by the University Grants Committee since 1919.

After O.R.'s achievements during the 1939-45 War, many universities made appointments in O.R. It was no surprise that the Royal College of Science and Technology acted as it did. The Principal, Sam Curran, had worked at Farnborough in the early years of the war, and later on the Manhattan project in the USA and had been chief scientist at AWRE, Aldermaston for a period. His wife, Joan Curran, devised 'Operation Window', which is described by R V Jones in 'Most Secret War'.

Two earlier appointments in O.R. had been made, Bill Donaldson as senior lecturer and Norman Lawrie as a lecturer. Their backgrounds were in mathematics and computing. They had begun teaching O.R. to mechanical engineers as part of a final year class in Industrial Administration, but neither had formal qualifications in O.R. and at that early stage were not members of the young Operational Research Society. Doug came in with a Birmingham MSc in O.R. and a PhD and, somewhat younger than his colleagues, with clear objectives – to set up an MSc in Operational Research, to extend our teaching to undergraduates in the Business School which was our base, and to develop an active research programme. The MSc (initially an MSc in Operational Analysis) began in session 1965-6.

By 1968 Doug had a chair; an O.R. department was in existence, Andrew Jardine and John Macfarlane had been appointed to the staff; and a thriving research centre of funded research Fellows and research students had begun to grow. Two tenured staff from Mathematics department, both married men with families, moved to O.R. and took up research fellowships. One was Tony Christer who begin his research in maintenance and moved in 1986 to the Salford chair; and Tom Collings who spent many years as deputy head of a distinguished Health Services O.R. Unit under John Macfarlane, and then joined the Anglican Church of Canada as a priest, where he later became a bishop and his wife also a priest.

Doug's qualities were his outstanding intelligence, his capacity for work and his drive to get things done, his research orientation, his modesty combined with a great confidence in the power of O.R., his ability to inspire colleagues and research students, and his success in raising funds. Doug left Strathclyde for Manchester in the late '60s, but he had a continuing influence on the Department and gave it a strength and direction which enabled it to survive the travails of the late '80s, to emerge, with a change of name, as an outstanding Department of Management Science.

Having set up an O.R. group at Strathclyde, that was focussed on real problems and had very strong links with industrial O.R. groups. Doug felt it was time to redress the balance, so in Manchester he wanted to set up a much more research based department to push forward the basics of decision theory. He led this personally, writing a large number of research papers, and nine books and organising a number of research conferences, including one under the auspicious of NATO. He also recruited a number of colleagues to work in the same area – Ian Buchanan, Roger Hartley, Simon French and myself – all who moved directly to chairs in other departments when they left Manchester. In fact there are more than ten of Doug's' protégés who have become professors at other UK and Canadian universities.

The department at Manchester was called the Department of Decision Theory and has been the only one under that name

anywhere in the world. Doug's personality meant there was a real work ethos but also lots of fun and some real eccentricity. Doug was a reluctant convert to computers and before that was reluctant in his teaching to move from blackboards to overhead projectors. When he did so he had the view that one OHP slide should have on it what used to be on one blackboard. The first lecture when he introduced this approach had all the audience clustered around the white board trying to understand a slide with lines and lines of the most detailed of formulae. Doug's other idiosyncrancies was his desire to have fresh air and that his wardrobe consisted exclusively of white shirts. Even in the Manchester winter, the windows were open in his room and the sleeves of his white shirt were turned up to the shoulder.

Most of all though was his generosity of spirit and his willingness to encourage new ideas. Whatever ideas the rest of us got involved with, he would be supportive and come up with some original way of thinking about the problem. It was no surprise that all the others in the department left to professorships. It was also a department before its time in that if the RAE and REF had been in place then it would have ticked the boxes for high grading in culture and output.

It is a truly remarkable man who can form three such disparate but high quality departments that Doug succeeded in doing at Strathclyde, Manchester and Virginia.

Doug's accomplishments are clear and indisputable: his contributions including thoughtful books on decision methodology and theory, dynamic programming, and operations research are fundamental material, and he authored numerous papers that have provided the foundations in Markov decision processes, multi-objective decision making and the application of heuristics. The statistics on publications and impact are extensive - I don't need to catalogue them here.

But this is not what Doug was about personally to me. I had interacted with Doug on several occasions at conferences and other events prior to Doug joining our faculty at the University of Virginia for the first time in the late 1980s. I was greatly anticipating, but completely intimidated with, the thought of someone of his calibre and reputation joining our faculty. What I quickly learned, after several meetings where I was totally befuddled by Doug's relentless sense of dry humour and his overwhelming knowledge about anything and everything concerning operational research, was that Doug was a pleasure to work with and that there was no need to worry about working with a giant in our field. He quickly became a leader in our department; however, he never did accept the Virginia uniform – Khaki pants and blue shirt – and instead he maintained a classic wardrobe of grey pants and a white button-down shirt - his sleeve rolled up to his elbow.

What I did see and learn in working with Doug was what a role model for a true scholar was – and there are very few, if any that have the characteristics and qualities that Doug exhibited throughout his career. Doug worked with the entire faculty while at Virginia and published papers with most of us, and it was his

'It is a truly remarkable man who can form three such disparate but high quality departments that Doug succeeded in doing at Strathclyde, Manchester and Virginia. '

extensive knowledge combined with his total humility and openness that allowed everyone to be able to work with Doug. Regardless of the subject, Doug could and did add insight and value.

But the attributes that best describe Doug to me are humility, honesty, integrity, character, and truth. In my career I have seen a considerable lack of these attributes, but Doug stood above all of this in an unmatched class of his own. In his roles as Chaired Professor, Dept. Chairman, teacher, adviser, colleague, co-author, committee member, etc., there was never a single doubt as to his absolute and unmatched qualities.

More important to me was the friendship and mentorship that we developed throughout the years. Doug and I worked together designing new programs, such as our National award winning capstone program, and technical research papers. Through these efforts Doug was always the wise and consummate teacher, never impatient, never critical but always gently instructive, and always with a good joke – ones that often took minutes for me to realize he was joking. During drives to meet with potential clients for the capstone program, Doug and I were able to spend considerable time together, often in my Porsche – which I could never drive slowly enough for Doug. I no longer own that Porsche, but I am sure that Doug's fingers are forever imprinted in the dashboard—where he was holding on for dear life. Doug and Hazel were always fond of exploring Virginia and trips to Colonial beach, and we almost were able to keep them permanently in Virginia – Hazel was willing!

We were fortunate enough to have Doug and Hazel visit for a second tour at Virginia. When Doug left Virginia the second time and retired to their home in the U.K., he gave me his collection of books, many original and one of a kind in our field. It is a collection that I treasure. Over the years since Doug and Hazel left Virginia we were able to keep in touch. With my wife, Amy, we were able to visit with Doug and Hazel during an extended trip to the UK. We took a long walk - not atypical for Doug - along the coast at Bournemouth. I was also able to visit Doug and Hazel during their trips to Atlanta to see Ali and Liam, and I cherish those visits.

Doug will always be to me the characterization of a true Professor and the consummate friend – I miss him dearly.

<OR>

EARLY BREAKTHROUGHS IN SOFT O.R.

JOHN FRIEND

Three more IOR legacy files have now been added to the new document repository section of the OR Society website. One of them reports on the first field trials of a decision-focused approach to problem structuring that is now in wide use by O.R. scientists and others; another records a public event that paved the way for later O.R. contributions to policy science.

I have now scanned another three of the more significant documents from the formative years of the Institute for O.R., and lodged them in the Document Repository section of our Society's website. They report key stages in the extension of IOR's repertoire during the 1970's, following its formation in 1963.

The first two of the new files reproduce hitherto unpublished conference papers. The first - *IOR1970Logimp.doc* - marks an early breakthrough in the application of new problem structuring methods in partnership with town planners, while the second file - *IOR1971RSAconf.doc* – records progress in understanding the inter-organisational dimensions of public policy. Both these landmark events were to pave the way for subsequent advances in O.R. methods, and to wide applications here and overseas.

The third file – *IOR1976Policy.doc* – reproduces the content of a promotional leaflet printed in 1976, under the title of *New Directions in Planning and Policy Research: the Contribution of IOR.* This leaflet explained how IOR's approach had evolved by that time through a diverse portfolio of project work for government and industry. It included an impressionistic time chart which is reproduced here. There were now 22 scientific and six administrative staff [1] working from offices in London, Coventry and Edinburgh; it was however becoming evident that a climate of growing economic turbulence and increasing constraint on public expenditure would make this momentum much harder to sustain in the years ahead.

First trials of the Strategic Choice Approach

The report that you will find in *IOR1970Logimp.doc* describes the design and the outcomes of a short action research project, with six English local authorities as partners, which was supported by a six-month government grant. The aim was to test the practical value in local development planning of the then newly-articulated toolbox of the *Strategic Choice Approach*. This package of visual O.R. communication tools, built around the problem-structuring language of *Analysis of Interconnected Decision Areas (AIDA),* had been put forward the previous year by Neii Jessop and myself in our book on our completed local government research. [2]

O.R. readers may be interested to see the outline descriptions in Part II of the LOGIMP report of the six clusters of local decision problems that were tackled jointly by the six local authority planning teams and their IOR advisers. The first report, relating to an area regeneration project in Teesside, offers a particularly graphic description of the relatively open structure of such a local planning situation, as compared to the kind of corporate planning and control situation more typically encountered by analysts working in a business setting. For the situation here was one of convergence of choices of different types facing different decision agents on different time horizons – requiring the planners to address the inter-relationships between them, moving forward in incremental steps yet in a publicly accountable way.

These six short reports were written by members of the local planning teams rather than their O.R. advisers, reflecting their early attempts to express the problem situation they were tackling through a new language of decision areas, uncertainties and incremental progress, rather than from the town planner's more familiar perspective of spatial design. Because the toolbox of strategic choice was then still far from fully developed, there was much experimentation in adapting it to each specific local situation. This spirit of experiment is also clearly reflected in the post-project evaluation exercise that was designed and analysed by two members of the IOR team. The results of this evaluation were summarised in Appendix II of the LOGIMP report – revealing, significantly, that the planners viewed the new language of decision areas as of value not only as a technique but also as an 'attitude of mind'. [3]

Insights from O.R. into decision-making in public policy networks

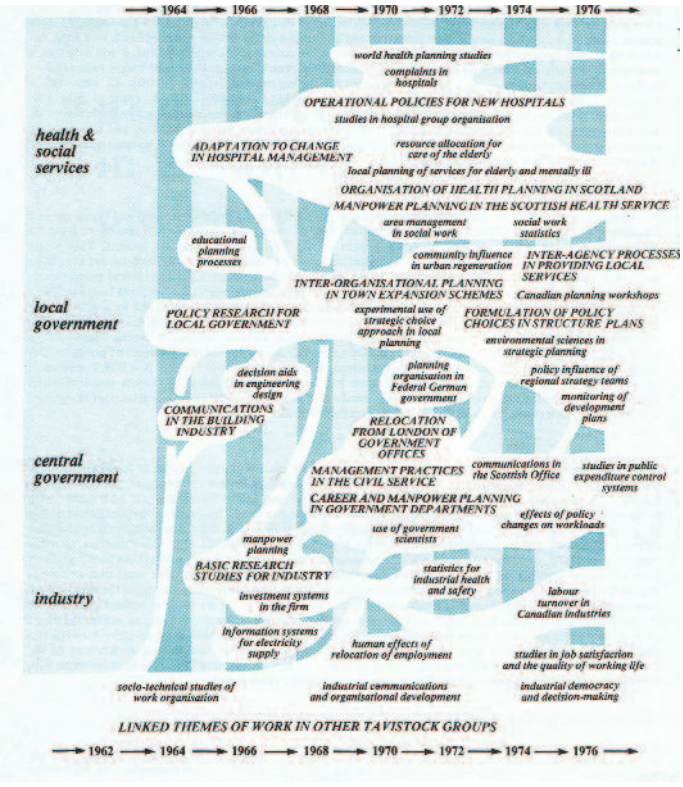
The second set of conference papers, reproduced in the file *IOR1971RSAconf.doc*, reports how a new O.R. approach to the challenges of inter-organisational decision-making was developing during the early 1970's through a research project funded by what

is now the Economic and Social Research Council (ESRC). [4] That conference addressed what was at the time the highly topical issue of local government reform.

The first conference paper, building on insights first articulated by John Stringer in our Society's Journal [5], demonstrated the use of a new form of structural diagram to map the complex linkages among both the organisations and the individuals involved in any complex planning issue. This approach was to be extended further in a book published in 1974 [6], with a series of case studies relating to the planned expansion of Droitwich in the West Midlands. The companion conference paper by John Power complemented the first paper in its more scholarly approach, offering a critical review of the writings of published authors ranging from urban planners to social scientists.

Appended to these conference papers you will find a list of the 150 participants in that half day event. It was held at the Royal Society of Arts in central London in December 1971, and attracted an encouraging cross-section of the opinion formers who were then engaged in the topical debate on local government reform in Britain.

MAIN CURRENTS IN DEVELOPMENT OF IOR WORK 1963-76
[programmes and larger projects in upper case]



Subsequent developments

Further documents that I aim to deposit on the Society's website soon will record some further advances in theory and practice that the staff of IOR were able to build on these foundations, working alongside consultants, researchers and public servants in several parts of the world. Some of the published outcomes of these later developments can be found in the list of references in *IOR2011Legacy.doc*. [7]

[1] As was typical in that era, the scientific staff was predominantly male and the administrative staff all female.

[2] *Local Government and Strategic Choice*: first edition 1969. While this book has now been out of print for several years, it has recently been agreed that it will be reprinted in a new *Routledge Revivals* programme.

[3] The planners however gave a relatively low rating to the value of the methods in communicating with the public; this has since been called into question by later evidence of their successful adoption in community O.R.

[4] Then known as the Social Science Research Council (SSRC).

[5] *O.R. Methods for Multi-organizations* by Stringer J. (1967) in ORQ, 18, 105-120.

[6] *Public Planning: the Inter-corporate Dimension* (1974). [for full reference see *IOR2011Legacy.doc* ref. 4].

[7] See in particular *Planning under Pressure* [ref. 11 in *IOR2011Legacy.doc*].

<OR

OPEN ACCESS – THREAT OR OPPORTUNITY?

JEFF GRIFFITHS, CHAIR, PUBLICATIONS COMMITTEE

'Unless there is international agreement on OA, this would imply that UK publishers would be supporting the rest of the world who have not embraced OA – UK readers would have to pay journal subscriptions for overseas-sourced material, while UK-published material may be read free of charge by non-UK researchers.'

Members of the Society are no doubt aware of the considerable publicity that has arisen from a speech made by David Willets, Minister of State for Universities and Science, at the Publishers' Association AGM in May 2012, where he set out the Government's approach to accessing research findings, particularly if that research had received support from UK public funds.

On the face of it, there seems little argument that these suggestions are both fair and opportune – fair in the sense that transparency is to be welcomed in matters which are financed from the public purse, and opportune in the sense that it would allow accessibility to the latest research findings for the growing number of individual researchers/consultants and SMEs - groups of people which the Government is making attempts to support. At present, such groups are often unable to afford the cost of accessing recent research. In short, Mr Willets states that he thinks there will be massive economic benefits to making research findings open to everyone. With this in mind he commissioned an independent group of experts, under Dame Janet Finch as chair, to investigate the issues. The Working Group reported back in June 2012 (http://www.researchinfonet.org/publish/finch), and the Government replied in July (http://www.bis.gov.uk).

The Society's Publications Committee has debated the Open Access (OA) issue extensively, and had the foresight some five or six years ago, when the possibility of OA publishing first came to the fore, to set up a Journals Reserve Fund to cope with any unexpected short term reduction in our journal income. Members will hardly need reminding that over 50% of the Society's income is derived from our share of journal revenues. Thus, any significant reduction in such revenues clearly must be regarded as a threat to the Society's viability.

So, what does OA involve? There are two major alternatives under consideration, but both have possible variations associated with them. The Finch Report strongly favoured 'Gold Open Access', which calls for research papers to be made freely available on the journal website immediately on publication. This means that such

material is accessible to everyone, wherever in the world they may be located, without charge. This immediately raises a problem. Unless there is international agreement on OA, this would imply that UK publishers would be supporting the rest of the world who have not embraced OA – UK readers would have to pay journal subscriptions for overseas-sourced material, while UK-published material may be read free of charge by non-UK researchers. The UK publishers would make their money by charging per article. Who would bear the cost? It is hard to envisage circumstances where individual researchers would have sufficient resources to pay from their own pockets – after all, the going rate is likely to be of the order £2000 per article. Would the financially stretched universities be able to bear the cost? The situation is far from clear. On the one hand university libraries may experience lower journal subscription costs, but would that balance the outgoings for article submission fees? At present UK universities pay around £200m a year in subscription fees to journal publishers, but, without international agreement on OA, universities would still need to pay subscriptions for journals published overseas. The present situation is that there are approximately 25,000 academic journals published throughout the world, with about 5,000 being UK-based, so universities may well be able to reduce their journal subscriptions. But would UK and overseas researchers continue to submit their papers to UK journals where they would have to pay the Article Processing Charge (APC) of around £2000, or would they submit their work to overseas-based journals where there would be no such charge? The UK Research Councils (RCUK) have decreed that, from April 2013, all work related to research funded by them must be published OA (www.rcuk.ac.uk/media/news/2012news/Pages/120716.aspx). This raises some interesting and problematic issues. For example, if overseas journals did not offer an OA option of some kind, then government-funded UK researchers would no longer be able to submit their papers to them. This means that UK researchers would be debarred from publishing in many journals which have high rankings in the various journal ranking lists (ABS, COPIOR, etc.).

The second method of OA under consideration is known as 'Green Open Access'. In this method, articles are freely available but are deposited somewhere other than the journal website (e.g. in a university repository, or the authors homepage). Green also means that publishers are required to make research openly accessible within an agreed embargo period. Various suggestions have been made regarding an appropriate length of the embargo period. It is necessary to strike a suitable balance between enabling publishers to generate revenue, via the usual subscription process, and providing public access to publicly funded information. At present our publisher, Palgrave Macmillan, states that authors are permitted to self-archive their papers to institutional repositories, OA repositories, or to their own websites after a period of 18 months has elapsed from date of publication in a formal issue. However, the version of the paper which is self archived cannot be the published final version of the paper. Instead it can be the author's final version (post peer review) of the paper.

Palgrave Macmillan (PM) is currently conducting a trial where a hybrid version of OA and subscription-based publication is offered. Under this programme, twenty of the PM journals offer authors the option of having their accepted articles published OA (on payment of an APC). These Advanced Online Publication articles (AOP) are not treated any differently and appear side-by-side with subscription-only articles, and are of course also included in the hardcopy printed journals as normal. This experiment is scheduled to last 18 months, and two of the Society's journals, OR Insight and Journal of Simulation, are included in this trial. Indeed, most existing UK-based journals are considering such hybrid models, where the journal remains subscription based, but with an OA option, thus enabling overseas researchers (and any UK researchers where OA was not a requirement) to submit to UK journals via the traditional no-charge route.

The main thrust of our discussions at the Society's Publications Committee and Board of Directors meetings has been to try to identify what actions we should take, if any, in the (inevitable) period of transition towards wider access. It is clear that our publishers will be doing their utmost to remain a viable and profitable organisation, and that holds out a reasonable hope that the Society will continue to receive adequate levels of resource from publication of our journals, thus offsetting any threat to our survival. On the other hand, maybe we should be welcoming OA as an opportunity for our many practitioner members to gain access to the vast literature which is currently unavailable to them.

As a final word, it is heartening to note that one of the recommendations of the Finch Report is that the Government should:

'Keep under review the position of learned societies that rely on publishing revenues to fund their core activities, the speed with which they can change their publishing business models, and the impact on the services they provide to the UK research community.'

OR54 EDINBURGH CONFERENCE

JOHN CROCKER

Who, other than a Scottish person, would have ever thought that one could get four sunny days in a row in Edinburgh in early September (or any other time of the year for that matter) but, however the organisers achieved it, this was only one aspect that they got right.

Andrew Macintyre, Piper

The venue was one of the best I have been to for OR Society Conferences (Simulation workshops aside). The accommodation was comfortable – I even managed to get some sleep on the first night. The food was not brilliant but there was quite a lot of choice and it was generally well cooked and presented. Everything was also very compact – even if it had been raining - there wasn't very far to walk between rooms, restaurant, streams and gathering points, although if walking was what you were after, the Salisbury Crags were only a matter of minutes away. In the other direction was the Commonwealth Games Pool – a full 50 metre pool available most of everyday.

Nearly 300 people took advantage of the event with over 2/3 of them presenting papers in one of the 24 streams spread across up to a dozen parallel sessions at any one time. Interspersed between these papers were the various plenary sessions and social events including a pub quiz, the gala dinner and Ceilidh, various tours and, of course, coffee, lunch and tea breaks which also provided ample opportunity to visit the ten exhibitors' stands. In addition to all this, we were also invited to listen to and judge the three papers in line for the 2012 President's Medal.

Sally Brailsford, no relation to David, of cycling fame, led another

lively debate on how O.R. can make an impact entitled 'Practitioner – Academic Collaboration: Maximising Research Impact' with Sean Jones (NATS) and Tony O'Connor (GORS) in the red corner (representing the real world – sorry, practitioners) and Mike Pidd and Stewart Robinson in the blue corner (representing academia). There was a full dress rehearsal of this debate at SW12 and although the audience was different, the debate followed very similar lines. Academics are not consultants and are not there purely for the benefit of practitioners but, in general, are happy to help if they can. Practitioners must recognise that academics have to publish papers as their own livelihood and that of their departments are very heavily dependent not just on publishing papers but publishing them within a narrowly defined timescale.

Although academia can provide very cheap research via MSc and PhD students, practitioners also have to recognise that these resources are only available at certain times of the year and have their own agendas. Where academia can help is in disseminating information – e.g. research findings – in a more accessible way. Open Access is not necessarily the answer to this problem – it is not always a case of not having access to published papers. Very often a paper will be unintelligible to a practitioner (or even to an academic not familiar with the given field).

As a direct consequence of this debate, John Lamb, University of Aberdeen has offered to take responsibility for a new 'column' in *Inside OR* in which a small number of papers that have recently appeared in anyone of our Journals will be explained in layman's terms. To help John in this endeavour, we will be asking the editors of our Journals to identify those papers which they think will be of most interest to practitioners and the wider public. It is also possible that these editors may also ask the authors to include a second abstract which explains the relevance of their paper to practitioners or the world, in general.

In conclusion, I felt the team led by Tom Archibald and supported by Hilary Wilkes with others too numerous to mention did a fantastic job. I would also strongly support another visit to this venue in the not too distant future. It was a shame there were no kilts in evidence at the Gala Dinner Ceilidh but it was great to see so much audience participation.

<OR>

OR54 A PERSPECTIVE

BRIAN LEHANEY

From 4-6 September this year, I attended, and also presented a paper on Knowledge Management and Sustainable Quality, at the OR54 Conference in Edinburgh.

On arrival at the accommodation (Pollock Halls) everything was in place and it took less than two minutes to check in. The members of staff on Reception were friendly and helpful. The room was clean with a modern (small) television. I did puzzle about the venue staff's expectations of delegates and students, as it seemed necessary for a notice to be placed on the WC to tell me to flush a second time if the first one had not worked! Conference registration was very quick and very efficient. The food throughout the conference was very reasonable. To my taste, the slow-cooked lamb at the conference gala dinner was excellent.

At the conference I experienced, for the first time, something I have been told to expect, which is people not knowing what QAA is and what QAA does. I shall not go into any detail here, but maybe an article for another time?

There were ten exhibitors at the conference. For me it was interesting to see how much simulation modelling has taken off, with at least three of the stands promoting simulation software of some sort.

As part of the Making an Impact Day I had intended going to the Networking for Introverts session, but clashes meant that was not possible. I therefore took part in the 'Build Your Own Pub' session, which was very enjoyable and helped provide further understanding

of the benefits of simulation modelling. I found the Speed Networking session to be great fun and much better than I thought it would be. The Data Visualisation session was full of simple but easy pointers to help improve impact.

The term 'analytics' has now become part of the language. The opening plenary by Geoff Royston (OR Society President), gave us an interesting overview of O.R. history, O.R. in the present and O.R. in the future. Geoff suggested that we need to be clear about the identity of O.R. and perhaps analytics is either what we do or at least a major part of what we do. Geoff emphasised that we should not confuse identity with image or name. The emphasis on analytics was re-enforced in another very interesting plenary presentation by John Hopes (OR Society VP and partner in Ernst and Young's Business Modelling practice). One of the presentations, by Sayara

Beg, was on 'Preparing your Data for Advanced Analytics'. A key aspect of this was the importance of saving time by **not** cleaning data! Some of the audience was sceptical, but Sayara made a very compelling case as to how this can work and how it saves an enormous amount of time and effort.

In general, my experience was that presentations ran to time and were very interesting. There was the usual issue of not being able to tell whether zero or thirty people would turn up to a paper, but with so many streams I cannot see how the uncertainty can be reduced other than to have people sign up to sessions. Would the effort in managing that be worth any benefit gained? Whilst on that subject, there appeared to be some disparity between the Making an Impact (MAI) stream and the other streams. MAI had a registration desk for its events, but other streams did not.

A general OR Society business discussion proved to be interesting and the issue of how MAI runs was discussed in this forum, as well as many other interesting questions. What is the future of *OR Insight*? Should conferences run at weekends? What should be done with OR Society reserve funds? These were just many of the questions raised and of course none were resolved at that time. It is up to us as members to be involved in the debates and ensure our voices are heard.

As always, it was really lovely to meet up with old friends and to make new ones. It would be lovely to see you all again, so please come along to KIM2013: www.theorsociety.com/kim2013

<OR>

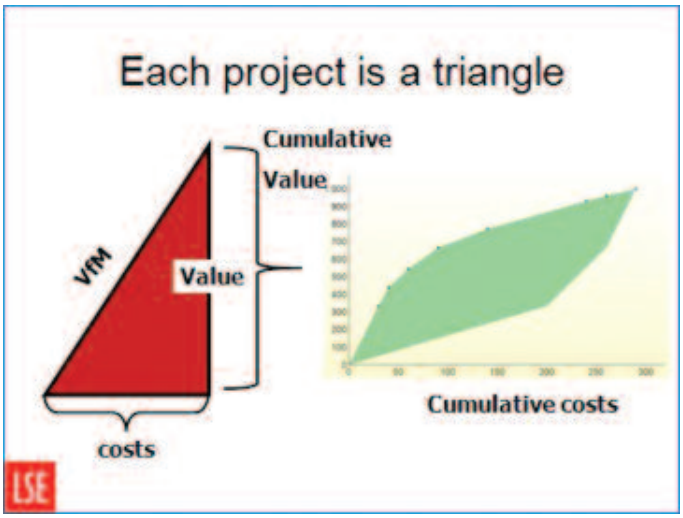
A GUIDED TOUR OF MULTICRITERIA PORTFOLIO DECISION ANALYSIS: POLICY ANALYSIS IN BIS SEMINAR

IAN MITCHELL

Alec Morton, from the Department of Management at the London School of Economics and Political Science

Andy Jones the head of Profession for Operational Research in BIS introduced Alec's itinerary through 'Multicriteria Portfolio Decision Analysis'. This included a baseline paradox showing the importance of thinking carefully about assessment procedures in the portfolio context, and the craft of structuring and exploring Multicriteria Portfolio models, illustrated with stories from the field

In many organisations there are more options to pursue than there are means to do them. Picking the best portfolio of these options is a perennial problem for analysts, but systematic methods for structuring the analysis are available, under the label of Multicriteria Portfolio Decision Analysis (MCPDA). Alec's fields included defence, health and science where MCPDA have represented decision makers' views of value and so aided their decisions.



The fundamental idea is simple. Each project is shown as a right-angle triangle, with costs along the horizontal and beneficial value up the vertical. The steeper the gradient of the triangle the better value for money the project offers. An optimal portfolio is a set of triangles arranged with the steepest first, as shown in the Pareto diagram showing cumulative value against cumulative costs.

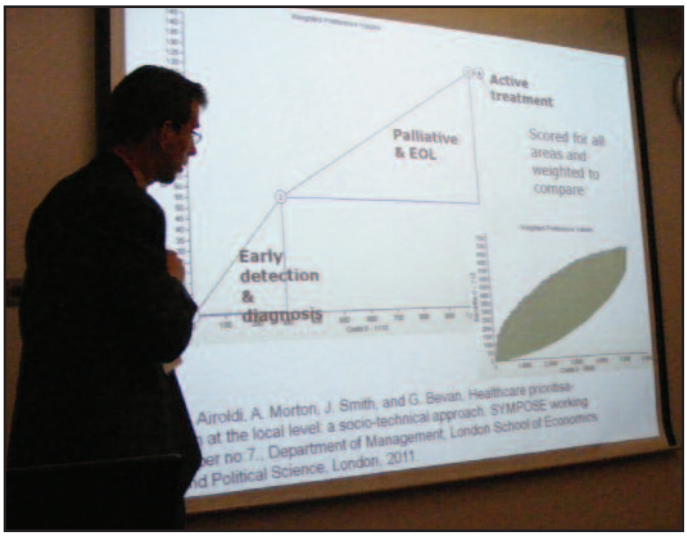
Where there are portfolios there are stakeholders, many of whom are not analysts. For a portfolio to be acceptable it has to be

Alec Morton (left) and Andy Jones (right) at the Department for Business Innovation and Skills

understandable to them. Structuring MCPDA models is an art as much as a science. Considering the effects of perception on the participants is essential. For instance, if projects are not the same size, assessments will exhibit scope insensitivity whereby smaller options receive a disproportionately high score. Other complications include portfolio balance, where constraints exist from needs for a balance between competing areas, and interactions of various sorts between projects.

Visual exploration of MCPDA models allows participants to develop confidence in the results from these models. Triage displays indicate which projects are the most frequent members of non-dominated portfolios. These are like those all round performers in a squad who keep appearing in the winning teams. Bubble charts give overviews of the performance of different projects and the Pareto display is useful in communicating the better or least worst way of spending various levels of resource.

Stories from the field included assessing health benefits for the Isle of Wight population through Multi-Criteria Decision Analysis within a Cost Effectiveness Analysis framework (Airoldi et al, 2011) and an application to Portuguese health service planning, in which the



Alec Morton describes a Pareto display of possible project combinations

software PROBE was used (Lourenço et al., forthcoming). Resources are not always money. In Portugal time was the constraint with 14 possible projects requiring 18,450 nursing hours but only 17,460 nursing hours available

Multicriteria portfolio procedures offer a systematic and orderly approach to decision making. It is a practical approach to decision aiding in times of both growth and austerity but is a critical aid in the leaner times.

Alec's book 'Portfolio Decision Analysis' (Salo et al., 2011) is a comprehensive resource. Capturing lessons from the field so that they can be remembered and reused has great value, as the seminar demonstrated.

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29 ISMOR – ANALYSIS FOR AN AFFORDABLE FUTURE

NOEL CORRIGAN, SECRETARY DEFENCE SPECIAL INTEREST GROUP

In bank holiday week at the end of August nearly 80 analysts from 10 countries gathered in the south of England for the 29th International Symposium on Military Operational Research (29 ISMOR). 23 papers and 4 workshops explored the themes of affordability, support to current operations and systems for an uncertain future. The four day symposium provided an innovative and exciting programme which participants found enjoyable and rewarding.

The 29th International Symposium on Military Operational Research (29 ISMOR) marked the start of a new era, with the previous Chair David Faddy handing over to Peter Starkey. David had run the show since 1995 when he succeeded the event's founder Professor Ronnie Shephard. ISMOR is the premier international conference on military O.R. (operational analysis). It is sponsored by Director Scrutiny within the MoD (currently in the person of Dr Syd Morley), and co-sponsored by the Defence Special Interest Group of the OR Society. It is also strongly supported by the Military Operations Research Society of the United States of America.

Most of the 29 ISMOR fraternity gathered on the steps of New Place, Hampshire

This year's programme was exciting, busy and innovative without losing the charm of this wonderful, different kind of a conference. As always, the plenary papers and evening activities ensured that all the delegates had the opportunity to meet and speak with each other, even (let it be admitted) to the extent of sharing the odd drink in the bar.

Innovation and Tradition

This year there were a number of innovations at ISMOR, together with plenty of tradition. As is traditional all the papers were delivered in plenary, but with the innovation of two invited keynote papers delivered to set the scene. First up was Major General Paul Jaques (the British Army's Director General Logistics Support and Equipment). He delivered an insightful view of the user's perspective on the benefits provided by decision support analyses, as well as some thoughts on how not to do it. This set the scene for the event. Simon Jewell (MD Niteworks, a unique partnership of industry and government) provided a *tour d'horizon* of the front end of defence procurement in the UK.

A further innovation was a full day of workshops, including parallel sessions and poster presentations. These started with a session on the new NATO Code of Best Practice for Judgment- Based OA, published earlier this year. Phil Jones of Dstl facilitated a session that got the analytic juices flowing, challenging syndicates to list all the entities relevant to the question provided, and within 30 minutes identify as many different types of study addressing the question as they could think of.

Dave Sloggett facilitated a very enjoyable and instructive session on piracy, bringing the analytical puzzles and problems to life with many anecdotes, some from his own experience. Meanwhile, John Nelson from American Systems was exploring methods for assessing non-lethal weapons as part of a NATO scientific study. This session was highly engaging, with a great deal of sharing of ideas amongst the analysts in the room.

Maj Gen Paul Jaques addresses 29 ISMOR

The Beginning

The first session of the symposium majored on affordability, a topic for which there seems to be no common currency in terms of definition (a common theme throughout the week was that resorting to dictionary definitions of terms usually proved less than enlightening).

Papers from the UK, Sweden, and Canada demonstrated the international concern with tightening defence budgets, seemingly constant major reviews of defence spending, and the need to identify how we can 'do less with less'.

This was followed by the theme of support to and analysis of operations. Papers from Australia, NATO, the US and the UK showed a variety of approaches to identifying, learning and benefiting from lessons from current operations.

Tuesday ended with an informal evening presentation from Chuck Hawkins, describing his personal take on the how China is using economic and military leverage to integrate North Korea's Hamyong province. A really fascinating and under reported topic, which kept his post-prandial audience enthralled (well, most of us anyway).

The Middle

Of course, ISMOR is not all fun, and on Wednesday afternoon delegates who were not viewing the posters or attending one of the workshops had the option of either proceeding to the Golf Course, where they enjoyed a thorough soaking, or proceeding to the Portsmouth Historic Royal Dockyards, where they did not. All were gathered safely back for dinner, where we were entertained once again by Dave Sloggett, with tales of his experiences in Gold Command at the recent Olympics.

Thursday's session focussed on systems and capability for an uncertain future. A wide range of innovative techniques and approaches were discussed, from the difficulties of defining that uncertain future, through the means of assessing options at the concept stage to the evaluation and enhancement of deployed capability.

Memorial Address

Following a splendid banquet (duck, since you ask), The Ronnie Shephard Memorial address was delivered by Major General (retd) Mungo Melvin, a distinguished strategist and military historian recently retired from the British Army. Mungo delivered a stirring address on the lack of real strategic thinking in the British establishment in recent years, and the role analysts might play in reinvigorating that skill.

The End

To close proceedings, Peter Starkey presented the traditional awards. The honour of Best Paper went to Yvan Gauthier of DRDC in Canada, for his paper on the applications of risk analysis to the Canadian forces' domestic operations. Jeffrey Appleget from the Naval Postgraduate School in the USA was commended for his entertaining and enlightening paper describing best practices for irregular warfare data quality control (not half as dry as it sounds). Craig Clark of Decision Analysis Services in the UK received the award for the best new presenter for his paper on getting affordable solutions, or how much to spend and when to spend it.

A special award was then given to David Faddy to recognise his immense contribution to the enduring success of ISMOR over the last eighteen or so years; and another to Gene Visco in recognition of his continuing efforts as the liaison between ISMOR and MORS in the USA. As is traditional, thanks were also given to Trish Follows and Muriel Wilson for ensuring that everything ran smoothly as usual. Trish has been handling administrative matters for ISMOR since it started, and is the only person to have attended all 29!

Nearly all the material presented at the conference is available on the ISMOR website (www.ismor.com). Most papers from previous ISMORs are also available here, via the link to Cranfield University Library.

Syndicate session in full swing

The Future

Next year is a major anniversary for ISMOR – 30 years of providing a forum for Operational Analysts from around the global to debate matters of moment, of the past the present and the future, and to share a beer or two in convivial surroundings. The calling notice for next year's 30 ISMOR will appear at the turn of the year. Make a note on your calendar for next year's event – and watch out for more innovation to spice up the tradition.

ANALYTICS VERSUS FRAUD

NIGEL CUMMINGS

The power of predictive analytics is being combined with link analysis to improve fraud detection rates across a wide range of services including healthcare, finance and the insurance sector.

Link analysis can detect potential fraud by evaluating relationships between nodes.

In network theory, link analysis is a data-analysis technique used to evaluate relationships (connections) between nodes. Relationships may be identified among various types of nodes (objects), including organisations, people and transactions. Link analysis has been used for investigation of criminal activity (fraud detection, counterterrorism and intelligence), computer security analysis, search engine optimisation, market research and medical research.

£260bn is lost to fraud (and error) each year in the healthcare sector around the world. A report by PKF Accountants and business advisers and the University of Portsmouth recently highlighted that £1 trillion of healthcare expenditure provided across the globe between 1998 and 2009 was found, on average, to be composed of 7.29% fraudulent claims.

At a global level, annual losses in the healthcare sector of £260 billion are enough to build more than 2,600 new hospitals each year (at developed world prices). Reducing such losses is one of the least painful methods for improving efficiency in the healthcare industry in the current economic environment because fraud costs – unlike expenses relating to staffing, accommodation, utilities and procurement – are unnecessary and unproductive.

Fraud costs have until recently, not been given a particularly high priority by management, so there is significant scope for losses to be reduced. Lack of priority in this area was probably due to a shortage of the right tools for fraud prevention and detection, but new developments in data analytics and link analysis procedures can now provide effective fraud detection and prevention solutions.

Until recently, much of the effort to combat fraud has focused on the laborious process of attempting to recover money from false claims after they have been paid. Such a 'pay-and-chase' approach takes about one to two years, and in some cases many years per fraudulent claim.

The application of predictive analytics can combat fraud by identifying patterns in claims that may point to fraudulent activity, and by understanding payers' transactional and relationship data to uncover wider instances of fraud. Predictive analytics enable healthcare payers to target unknown types of fraud, identify new schemes and discover networks of fraud.

Payers often start with a rules-based approach that flags claims that fall outside certain parameters. The first step is to identify potentially fraudulent patterns and then develop the rules to flag them as claims are processed. The rules could include instances such as specialist providers who bill using a particular code more than a certain number of times a month, or charges for services outside their areas of expertise.

Predictive analytics make this rules-based approach more effective, identifying more fraud and creating a line of defence against 'unknown' schemes that conventionally-enabled rule-structures do not catch. Every time a new type of fraud is identified, the predictive analytic models are updated and new rules developed. The intelligence in the predictive analytic system then 'learns' from the new rule patterns and builds increasingly more sophisticated models.

The most effective, predictive models not only highlight claims with the highest likelihood of fraud but also describe the reasons each claim looks suspicious, so claims can be assessed with high productivity. By adding 'link analysis' to this process, a new dimension to fraud prevention has now been created.

When a claim reviewer is examining a single claim, it is very helpful

to see the larger picture for a given provider or claim. Link analysis examines relationships among claims, people and transactions. It is commonly used by banks and insurance companies to improve fraud investigations, expose money laundering schemes, uncover criminal rings and detect insider dealing fraud.

Government fraud investigation departments also use link analysis to enhance screening processes, understand and uncover terrorist networks and investigate crime. It also has general applicability for any organisation that wants to better understand its customer relationships and consider the impact of both formal and informal networks of people, groups, organisations and events.

Link analysis works by detecting related claims in seemingly unrelated instances, such as 'crash-for-cash' motoring fraud schemes where criminals cause collisions in order to file whiplash and other fraudulent claims. Applying link analysis to a wide variety of databases creates a visualisation of the relationships between various parties, including doctors, lawyers, vehicle owners, drivers, etc. By applying link analysis, payers can see how separate claims may actually be part of a larger scam involving a fraud ring.

Insurers deploying analytics and link analysis as part of their anti-fraud efforts can expect to see reductions in fraudulent claim losses of 20 to 50% and loss adjustment expenses of 20 to 25%. Predictive analytics and link analysis also helps payers detect more fraud, prioritise claims by likelihood of fraud, reduce false positives by more accurately identifying real fraud, and improve customer satisfaction by streamlining the payment of legitimate claims.

<OR>

I AM NOT AN ARCHITECT!

DAVID SMITH

Dear Sir,

In September's issue, the president suggested two analogies for O.R.: medicine and architecture, to which the Editor of *Inside OR* added the third of engineering.

While I am happy with the first and the third, I have some reservations about the second.

The analogy that an O.R. scientist acts as a doctor is a helpful one; the doctor's aim is to solve the problem - in this case, the problem of sickness or pain, and therefore enters a cycle of collecting information, intervening and participating in a feedback loop with the client (patient). It is especially helpful because the natural association of the work of a doctor is to solve a problem. There are limits to the analogy, particularly when one thinks of hospital specialists whose expertise is concerned with particular problems.

Again, engineers solve problems, and they too enter a feedback loop of collecting information and data, modifying their design or product, making tests and evaluations with the aim of making something work successfully. The downside of this analogy is that the first association one may make with the profession of 'engineer' is not as a problem-solver, but as the motor mechanic or building site worker.

There are many positive aspects to thinking about O.R. scientists and architects as coming from similar moulds. Architects use models to think with and their models or diagrams may go through several iterations as they engage with other people; just like O.R. people. Architects are concerned with a large system, and see the place of their work in an overall system; just like O.R. people. Architects are concerned with multiple academic disciplines and using different kinds of resources well; just like O.R. people. Architecture combines art and science, a reminder for all of us that operational research involves creativity. But, for many people, these are not the associations that will spring to mind when the job-title 'architect' is mentioned. That's where I have my problems with the analogy. They are two, interlinked problems. One is concerned about the definition of the client; the other is concerned with the timescale of the feedback to the architect. An architect may have many 'clients' for a project; the builder, the owner of the building, the people who occupy the building, visitors to the building, those who maintain the building. A good architect will think of each of these, but will not be able to interact directly or indirectly with them all. And there is no easy mechanism to alter the architect's work with feedback once the construction is complete. Part of the best O.R. is that iterative loop of feedback and change once the clients (seen and unseen) have started to implement the results of the O.R. work. The second problem is timescale. Generally an architect's work is there for many years. Feedback is not possible for the users, owners, occupiers, etc, after many years. (For example, my house is almost 80 years old. I am unable to feed comments and suggestions to the architect about aspects of poor design of the house.) There may be some O.R. results which last for years, but they are very few. Perhaps a better analogy would be the designer of a fitted kitchen, something which is semi-permanent within the building.

Hence, I am happy to be thought of as a doctor, engineer - but I am not an architect!

Sincerely
David Smith

< OR >

IMAGE ANALYSIS CREATES CITY IMAGES

NIGEL CUMMINGS

What makes Rome look like Rome, Prague look like Prague, Paris look like Paris or any American city look, well, just like any other American city? Machine learning can now be used to identify locations, though it is not infallible as some recent research suggests.

These two photos might seem nondescript, but each contains hints about which city it might belong to. Given a large image database of a given city, algorithm is able to automatically discover the geographically-informative elements (patch clusters to the right of each photo) that help in capturing its "look and feel". On the left, the emblematic street sign, a balustrade window, and the balcony support are all very indicative of Paris, while on the right, the neoclassical columned entryway sporting a balcony, a Victorian window, and, of course, the cast iron railing are very much features of London.

Apparently many world cities carry unique signatures, the details woven into their urban fabric form a pattern, and machine learning systems can 'data mine' the patterns to provide fairly accurate identification of cities. Researchers at Carnegie Mellon University and INRIA/Ecole Normale Superieure in Paris mounted a U.S.-French visual data mining project has accomplished the task of identifying cities just by looking at random photos.

Researchers on this project had their artificially intelligent system look at 40,000 Google Street View images of Paris, London, New York, and Barcelona, as well as eight other cities to find frequent and unique elements. The machine learning program found features like the street signs, balconies, and lampposts of Paris to be distinct.

However, 'it had more trouble identifying geo-informative elements for U.S. cities, which the researches attributed to the relative lack of stylistic coherence in American cities with their melting pot of styles and influences'.

Snide comments regarding American cities apart though, this research is interesting for other reasons, because it represents part of the emerging field of visual data mining, which is more complex than looking for patterns in text or numbers.

According to Alexei Efros, CMU Associate Professor of Robotics and Computer Science, 'Our data mining technique was able to go through millions of image patches automatically - something that no human would be patient enough to do. In the long run, we wish to automatically build a digital visual atlas of not only architectural but also natural geo-informative features for the entire planet.'

To identify the cities, the software developed by Carnegie Mellon and INRIA, finds visual markers that are reasonably common but only within a particular city. For example, fire escapes are a trademark of New York, whereas Paris loves its cast-iron balconies. The shape of street signs is also a useful marker. Applications for the software include historical analysis of architectural influence spreading across an area, as well as identifying the location of images from what is in the background.

The system when developed further, could apparently, be utilised by 'film look' designers , it could do part of their work as CMU notes that 'art directors for the 2007 Pixar movie 'Ratatouille' spent a week running around Paris taking photos so they could capture the look and feel of Paris in their computer model of the city.'

Apparently the system ran 150 processors at that time to automatically produce its own set of iconic Paris-like images for use in the film – in the space of just five years though, technology has advanced considerably in this area. As well as recognising cities, city ID technology could also be applied toward creating virtual reality cities which have no physical existence but have the look and feel of real cities based on exploitation of 'unique' real city signatures, these 'cities' however would instead exist in 'cloud cyber space' and provide realistic experience for those wishing to inhabit them in, for example, game playing environments.

On a personal note, with my journalistic head on for this article I find information regarding visual data mining fascinating. Slightly off on a tangent, I am regrettably reminded from a research point of view, of a personal project I failed to complete in the 1980s whilst visualising 'virtual lens designs' for confocal microscopy. When calculating 'circles of confusion', refraction limitations and effects of selection of wavelengths and apertures with extremely short focal length lenses over varying field length ranges, I had the notion that visual isolation of data would be feasible by adapting optical depth of field algorithms to select fields of data and categorise them. I had neither the time nor computing power to complete the work. Nor did I have any understanding then of the future significance of data mining or data scoping as I called it – how times have changed!

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THE ALGORITHM THAT RUNS THE WORLD

JOHN CROCKER

A couple of weeks ago, I had a note from John Ryan addressed to General Council in which he drew our attention to not just an article but the 'cover story' in NewScientist (No. 2877, dated 11/08/2012).

Caricature of George Dantzig father of the Simplex algorithm

The author, Richard Elwes, Visiting Fellow, University of Leeds and also author of *Maths 1001: Absolutely everything that matters in mathematics* (Quercus, 2010), asks whether 'time is running out for the clever piece of maths that runs modern life'.

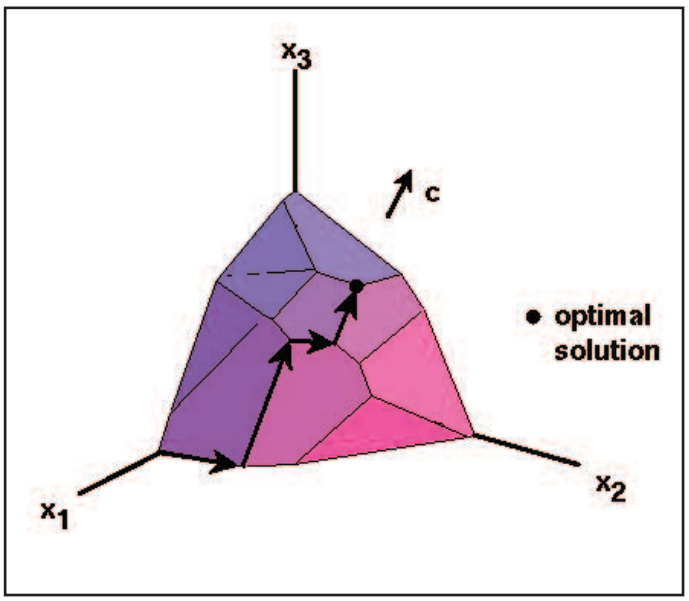
Apparently there is a set of cases for which the standard simplex method and other variants for solving LPs may not work. According to Elwes, so far these have not shown up in the 'real world' only in academia (as contrived examples).

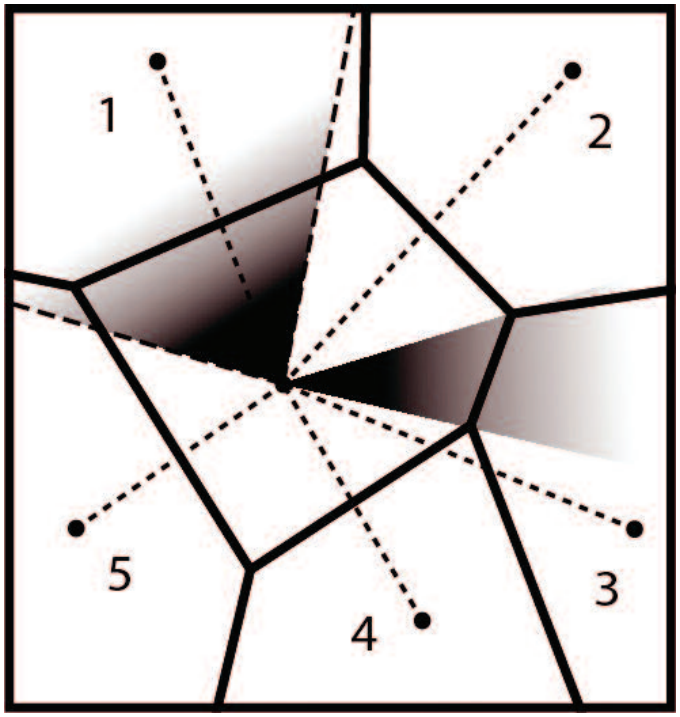
It transpires that this is the simplex algorithm for solving linear programs as devised/invented by George Danzig in the 1940s. His major breakthrough was in recognising that the optimum of the cost function lie at one of the corners of an n-dimensional object bounded by the [linear] equations, inequalities, constraints used to define the problem where n is the number of variables. Given that n is finite, the number of corners is also finite and hence likely to be considerably more tractable than if the optimum could be at any of the infinite number of points within the object.

In reality, the simplex algorithm tends to take order n steps to solve an LP where n is the number of dimensions. In mathematical jargon, this makes it a P-hard problem, meaning that the number of steps (or running time to solve the problem) is polynomial which means that linear programs with thousands or even millions of variables can be solved on today's computers. (Incidentally, the largest that we could solve in 1971 using a Honeywell 200 computer had just 20 variables, anything larger and there was no room left in the memory to perform any calculations or write out the results.)

In 1972, Victor Klee and George Minty devised a hypercube of n dimensions (and hence 2^n corners) which was so twisted that it required the cost function to be evaluated at every corner. Apparently, none of the variations on the simplex rule has proved to be any more successful at reducing the number of evaluations for these cases – one can always devise a problem for which the method performs very slowly. The good news is that such problems have not yet shown up in practical applications, i.e. the real world, only in academia.

There has been much work done on an alternative approach known as interior point methods which invariably require far fewer evaluations of the cost function but, alas, require algorithms of far greater complexity to determine which points to evaluate.





According to Jacek Gondzio, University of Edinburgh, some 80-90% of LPs are still solved using a simplex variant.

Steve Smale, Fields medallist, said, in 1997, that finding a new variant of the simplex algorithm that preserves all of the advantages but is also guaranteed to run in polynomial time is one of 18 outstanding mathematical questions to be dealt with in the 21st Century.

According to Hirsch's Rule (alas, a mere conjecture, stated by Warren Hirsch in 1957), the maximum number of edges you have to traverse to get from one corner to another is equal to the number of faces minus the number of dimensions. Take, for example, a simple cube (or die) then to get from one corner to that diametrically opposite it, one should not need to traverse along more than the number of faces minus number of dimensions (i.e. 6-3=3) edges. For a tetrahedron, it is 4 - 2 = 2 and an icosahedron it would be 12 – 3 = 9. After over a decade of working on the problem, Francisco Santos, University of Cantabria, has publish a paper in the *Annals of Mathematics* (vol 176, p383) which describes a 43-dimensional polytope ('flat-sided figure') with 86 faces which has at least one pair of corners at least 44 steps apart (i.e. at least one more than Hirsch's rule states) which has thus disproved the conjecture. Since Santos's work, polytopes with as few as 20 dimensions have also been found for which the conjecture is false. This means that there is no guarantee that there can exist an algorithm which can solve every LP in polynomial time.

Elwes makes the point that it is curious that no practitioners have, as far as we know, come across a problem that evades solution.

The author's suspicions are that if someone did, their first response would be that they had specified the problem incorrectly. They would then probably look at re-stating it in some way, possibly by relaxing one, or more of the constraints. I also suspect that the last thing they would think of doing would be to write a paper telling the world of their 'error'. One of the major differences between an O.R. practitioner and a mathematician is that there are no prizes for the former for proving that he or she cannot solve a problem. (In my experience, there are not that many for proving they can, either, but that is another story.)

<OR>

SIR HENRY TIZARD - PART 4 - PREPARATIONS

JOHN CROCKER

In Part 3 ('Between the Wars'), the famous Tizard Committee which was to become the custodian of the UK's safety, had been established with the support ACM Dowding. By early 1935 they had set up an experimental station at Orfordness to develop the capabilities of radio direction-finding (later to become known as RADAR).

Although war was still over 4 years away, 'the dark clouds were gathering over Europe'. At the end of WWI, there was a strong belief that the bombers would always get through and that no future war would be won without first gaining air superiority. It had been hoped that radio waves might prove to be an effective weapon – 'a death ray' – but calculations performed by A.F. Wilkins at the request of Robert (later Sir Robert) Watson-Watt concluded that this would never be a practical proposition but detection of in-coming aircraft might be put to good use.

Lindemann believed the problem of defence against bombers was too important and too urgent to be left to the casual endeavours of individuals or departments. Since Tizard had helped secure him a chair at Oxford, Lindemann had become very close friends with Churchill and several other influential politicians.

Tizard, by contrast, was a very strong believer that science and politics should be kept in their own 'water-tight compartments'.

Ramsey MacDonald set up a sub-committee of the CID[1] under Lord Swinton (who was described by Clark as open-minded, experienced and knowledgeable – the public servant *par excellence*) 'to consider not merely the scientific but also the political and more general problems of air defence'. This was later to become known as the Swinton Committee. Tizard's Committee now became a sub-sub-committee under this new sub-committee even though he was a member of both.

Lindemann sent a memorandum to Tizard. 'The ideas in this memorandum, Tizard wrote later, 'depend largely on two preconceived notions, both wrong". One was that to bring an aircraft down would require a barrage of around 90,000 shells per aircraft. The other was that because an aircraft had to be light to fly, it must therefore be fragile. He therefore concluded that the best method of defence would be to use small mines of high explosives attached to parachutes (weighing in the order of 200 grams in total) to produce detonation in the engine. Tizard made the comment, 'Many interested amateurs make this impractical suggestion from time to time.'

It appears that Lindemann had completely misunderstood RDF having confused it with a totally ineffective method of scattering radio beams. He also had a very low opinion of anyone working in any of the Research Establishments believing they would be very reluctant to work on any ideas other than their own – a view with which Tizard strongly disagreed.

From 1935 onwards, Tizard's main tasks were to oversee the development of the capabilities of radar, work out how best it could be deployed, explain these to politicians and Civil Servants and get their support and commitment. At the same time, new ideas were starting to pour in; some based on science but many based on pseudo-science. He recognised that radar could be invaluable to the Navy. He worked out how it could be used to direct guns onto enemy ships even before they came into view, for example, but when he explained this to a 'naval expert' he was told in no uncertain manner that there was no room on a warship for any more aerials.

Tizard's ability to talk to service personnel on their own level understanding the practical difficulties and limitations on what a pilot could be expected to perform whilst trying to keep his aircraft in the air and avoid being shot down put him in good stead. Without this, it is very likely that radar would have played no active part in the defence of the UK from aerial attack.

By mid-July 1935, radar at Orfordness was able to detect aircraft at a range of 40 miles. By August, they were able to calculate the height of these aircraft to within +/- 1000ft (300 m) and by Christmas, they had gained Treasury approval to start building a chain of radar warning stations. By March 1936, Watson-watt and his team had extended the capability of radar to pinpoint an aircraft with respect to its distance, height and direction upto 75 miles from the coast.

Meanwhile, Lindemann was still insistent that the solution lay with aerial mines. To this aim, he was demanding that efforts should be made to determine what happened when aircraft ran into wire from which [aerial] mines were attached. Unfortunately, the experiment was considered, even in those days before the advent of H&SE, to be too dangerous to risk either a pilot or an aeroplane. The RAF did have a radio-controlled aircraft called the Queen Bee but none would be available until at least late 1936. A scaled down version was however proposed in which the mines were replaced by bottles

of ink and the steel cables connecting then to the parachute were replaced with fishing line.

There were two distinct, but obviously related problems. The first was to find the incoming aircraft in time. The second was how to destroy them once found. Both problems needed to be handled differently for day and night raids. Radar, it was felt by all except Lindemann, would provide the answer to finding daylight raiders. Tizard believed it might also be possible to miniaturise it sufficiently to enable a set to be installed in a fighter so that the pilots could use this to guide them towards aircraft at night. Lindemann had suggested the use of infrared detectors during WWI. Work carried out by Dr A.B. Wood in 1926 had yielded negative results and these were repeated in trials in 1935 – the heat from even a 500 hp piston engine's exhaust was simply not high enough to be detectable by the equipment available at that time.

In the summer of 1936, things came to a head between Tizard and Lindemann. The latter complained that things were taking too long (due to shirking) and that not enough time was being devoted to research on aerial mines. He also believed that the Tizard Committee should have executive rather than advisory powers. Tizard, on the other hand, pointed out that accusing people of being slackers when they clearly were not would only hinder progress and that the committee would be happy to carry out research but first they would need him to put his scheme on paper. He concluded one of the many letters which passed between them with, 'I am much more interested in defeating the enemy than in defeating you!' It should also be noted that Lindemann had put his name forward for election to one of the two University seats [in Parliament] and was using the lack of a comprehensive air defence system as a platform for election. Hill, Blackett and Tizard resigned from the committee which was then reconstituted by Lord Swinton within days and comprising the same members as before with one exception.

Obviously we can only speculate what would have happened if Lindemann had taken over and Tizard had stepped down. The most likely result would have been that Britain would have lost the Battle of Britain as the highly effective and integrated Chain Home system of defence would not have happened without the unique capabilities of Tizard to drive it forward.

Radar, on its own, could not win wars. It might have been able to locate aircraft accurately but it could not stop them. This was again where Tizard's experiences as a pilot and his ability to talk to the lower ranks on the same level were invaluable. Reliable, accurate, early warning of numbers, heights and bearings of in-coming aircraft over water could eliminate the need for standing patrols thus reducing the number of wasted flying hours of both men and machines.

Knowing approximately where the aircraft are is one thing; getting the fighters to intercept them is quite another. Tizard recognised that an effective means of interception needed to be devised in peacetime as this simply wouldn't be feasible once war had commenced. In July 1936, he outlined his proposals for what became known as the Biggin Hill Experiment. The two aims of this experiment were to determine the percentage of successful interceptions against distance from coast and whether a pilot could be directed by radio from the ground [to intercept in-coming aircraft]. Many senior officers thought this to be a waste of time but despite this, Tizard got his scheme approved for a 2 month trial. Gloster Gauntlets were to be used as the interceptors whilst Hawker Hinds would act as the bombers.

Flying upto 5 interceptions a day in all weathers the success rate increased to close to 100% within a few weeks. This was fine as long as the bombers kept to a straight course but as soon as they changed, the rate of interception fell significantly. The problem was not that radar could not detect the change of course but the time it took to re-calculate the new interception course for the fighters (remembering that these calculations had to be done manually using tables and slide rules). Using simple geometry and the fact that fighters fly much faster than bombers, Tizard worked out a simple way to estimate the vector using isosceles triangles with the line between the bombers and fighters forming the base, the bombers' new line of flight the second side and the interception route the third side. Due to their relative speeds, the fighters would always arrive at the interception point first. Calculating the angles was still a bit tedious but it was discovered by accident that the ground 'director' could, by looking at the plots on a table, estimate the angles with sufficient accuracy. Tizard flew as observer in the bombers on several occasions to check the data but also to show the pilots that he was, himself a flying man and knew what he was talking about (even if he was over 50 and from a very different background).

Six weeks into the experiment and things suddenly went badly wrong. Tizard wrote a stern letter to Watson-Watt accusing him effectively of not working to standard scientific principles – making sure results are repeatable before going on to the next stage in development. He also berated him for running his [thermionic] valves (vacuum/electron tube) at full power (for very little benefit) and for not taking essential measurements which would have diagnosed the problem, without having to resort to guesswork. Fortunately, there was a recovery and the results were sufficient to convince the Swinton Committee to continue with the work with what results, I am afraid you will have to wait until next time to discover.

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

[1] Committee of Imperial Defence

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12 April 2013	Deadline for final conference paper submission
4-5 June 2013	Conference

A Special Issue (SI) of Knowledge Management Research and Practice (KMRP) will publish selected papers from the conference. Authors should notify the SI editors of their intention to submit to KMRP at the time of submitting conference papers. The call for the KMRP SI is available here:
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PASSIONATE ABOUT THE LEARNING AND TEACHING OF O.R. IN UK UNIVERSITIES?

JO SMEDLEY

Those involved in the teaching and learning of Operational Research at University level will be interested in recent key developments and opportunities from the Higher Education Academy (HEA).

The successful HEA Seminar held in May 2012 at Southampton University entitled 'Improving the Employability of O.R. Graduates' (featured in Inside O.R. in June 2012) was followed by another successful HEA seminar at the University of Wales, Newport focusing on 'Enhancing the Student Experience of O.R.'. Involving a cross-section of ages, experience and subject background, this brainstorming opportunity enabled the consideration of factors to develop the teaching and learning of O.R. as a subject and as a decision making approach at University level.

Suggestions for ways forward included promoting O.R. as a logical thinking tool as well as a mathematical tool, promoting O.R. through case studies relevant to several disciplines and using co-curricular developments to introduce students to O.R. techniques. It was clear from the discussion that home and international students often have differing expectations and experiences of learning presenting a challenge to their continued professional development. O.R., as a multi-disciplinary subject, offers the flexibility and versatility to be adaptable to a wide range of student learning in terms of learning abilities, employment experience and future aspirations. The event highlighted the versatility of O.R. involving specialist mathematics students or students studying components of mathematics within their degree programmes (e.g. bioscience, chemistry, computer science, economics, engineering, nursing, physics, psychology, social work, etc).

The CETL-MSOR Conference 2012, organised by the MSOR Network and held in partnership with the Higher Education Academy at the University of Sheffield in July 2012 reflecting this approach of sharing good practice in teaching and learning involving O.R.,. This event included the promotion, exploration and dissemination of established and emerging good practice and research which is particularly relevant to Operational Research support, teaching, learning and assessment across the UK Higher Education arena.

As part of this plethora of approaches to promote and enhance the learning and teaching of O.R., the HEA now has several funding opportunities available. These include funding for workshops to demonstrate good practice in O.R. learning and teaching, to support the attendance at UK Higher Education O.R. learning and teaching conferences and to enhance the development of learning and teaching approaches in O.R. Recently, there has also been a call for funding to support 2013-2014 doctoral studentships with discipline specific learning and teaching research or an interdisciplinary/generic pedagogic research perspective.

If you are involved in the learning and teaching of O.R. at University level and you have not yet investigated or exploited these opportunities, then more details are available at http://www.heacademy.ac.uk/disciplines/maths-stats-or or directly from Dr Mary McAlinden, Discipline Lead for Mathematics, Statistics and Operational Research at mary.mcalinden@heacademy.ac.uk. The Education and Research Committee of the OR Society is actively involved with these activities in O.R. so please watch out for more updates in *Inside OR* as they progress.

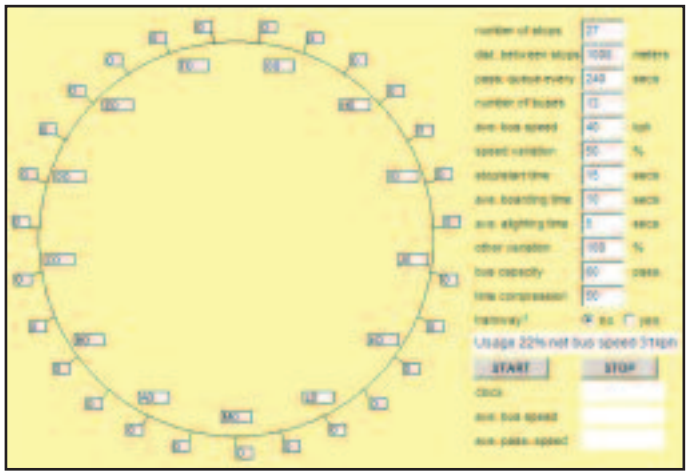
<OR>

YOU WAIT AGES – AN IRREGULAR NOTE

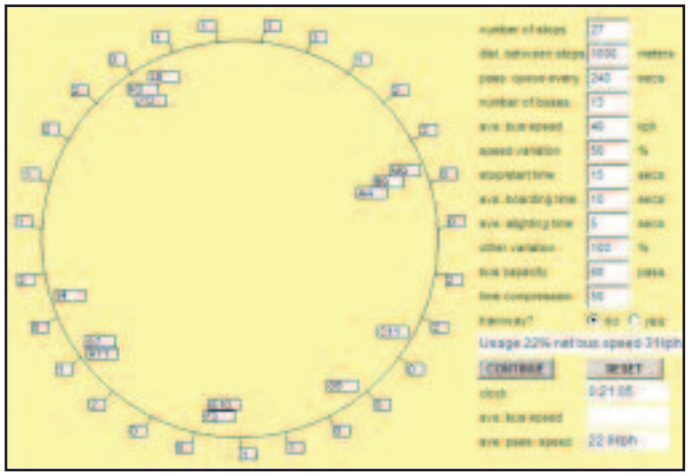
DIK LEATHERDALE

The article on bus bunching in the September issue of INSIDE OR was brought to my attention by a friend who knows my interest in such matters.

Years ago, when the Java programming language was fashionable, I decided to teach myself yet another language by programming a simulation of bus bunching. I'd worked out the mathematics and decided on an animation of the problem. It took a while but the result can be found by going to www.leatherdale.net and selecting 'Bus Bunching Simulator'.



The applet simulates a circular (and hence infinitely long) bus route with regularly spaced stops and (initially) regularly spaced buses. The viewer can configure the system according to taste – the number of stops, buses, speeds and passenger arrival rate. Crucially, the degree of variability of speeds and events can be varied. The bus stops arranged around the outside edge show the number of passengers queuing. The buses around the inside edge have a fleet identifier (A, B, etc) and show the current number of passengers.



Clicking START sets the buses in motion and passengers start to arrive randomly at the stops. As each bus arrives at a stop the passengers board and alight (random times taken) and as each passenger boards a random destination is chosen. After a while the buses inevitably start to bunch as shown here after 21 simulated minutes. Eventually there will just be one huge convoy making its way round like a single-sailed windmill.

Surprisingly, although setting the variability of speed and event occurrence to 0% (not achievable in practice, of course) reduces the tendency to bunch it doesn't entirely disappear. Additionally setting the number of stops to an integer multiple of the number of buses does.

The display is less than perfect because of the need to keep the amount of graphics processing within reasonable bounds. Nevertheless a copy was requested by a London bus company as a driver training aid some years ago and Transport for London asked for proof (which, not being an O.R. specialist, I was unable to provide) that introducing a smart card-only fare system would reduce bunching. In 2009, London Underground broke with 125 years of tradition and redesigned the Circle Line to run between termini so as to reduce service irregularity. Which rather demonstrates the folly of circular routes.

After the program was completed the wind was rather taken out of my sails when I discovered that the theory had been demonstrated (without the benefit of a computer) on the BBC's Blue Peter programme a while ago. Nevertheless, mine is a well-ploughed furrow. In the late 1950s a simulation was programmed by Mary Lee Berners-Lee (AKA Mary Berners-Lee squared) who was a pioneering programmer for Ferranti. And yes, in case you're wondering, she really is Sir Tim's mother.

Do feel free to try it out and, if the fancy takes you, I'd be happy to provide a copy.

Dik Leatherdale was (is?) a software programmer. He now edits *Resurrection,* the bulletin of the Computer Conservation Society (www.computerconservationsociety.org).

THE HUMOR COLUMN

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

I've found a joke suitable for the decisionLabs conference competition – just a tad too late to win the champagne…

A vicar, a doctor and an O.R. analyst were waiting one morning for a particularly slow group of golfers.

O.R. Analyst: What's with these guys? We must have been waiting for 15 minutes!

Doctor: I don't know, but I've never seen such ineptitude!

Vicar: Hey, here comes the Green keeper. Let's have a word with him. [dramatic pause] Hi George. Say, what's with that group ahead of us? They're rather slow, aren't they?

George: Oh, yes, that's a group of blind firemen. They lost their sight saving our clubhouse from a fire last year, so we always let them play for free anytime.

The group was silent for a moment.

Vicar: That's so sad. I think I will say a special prayer for them tonight.

Doctor: Good idea. And I'm going to contact my ophthalmologist friend to see if there's anything he can do for them.

O.R. Analyst: Why can't these guys play at night?

An old farmer came to town to visit the cinema. The ticket girl said, 'Sir, what is that on your shoulder?'

The old farmer said, 'That is my pet rooster, Chuckie. Wherever I go, Chuckie goes.'

'I'm sorry, Sir,' said the ticket girl, 'We can't allow animals in the theatre. Not even a pet chicken.'

The old farmer went around the corner and stuffed the chicken down his trousers. He returned to the booth, bought a ticket and entered the theatre. He sat down next to two old Accident & Emergency nurses named Mildred and Marge.

The film started and the chicken began to squirm. The old farmer unzipped his trousers so Chuckie could stick his head out and watch the movie.

'Marge,' whispered Mildred.

'What?' said Marge.

'I think the guy next to me is a pervert.'

'What makes you think that?' asked Marge.

'He's unzipped his trousers and he has his thing out,' whispered Mildred.

'Well, don't worry about it,' said Marge, 'At our age it isn't anything we haven't seen before.'

'Yes,' said Mildred, 'But this one's eating my popcorn!'

<OR>

NEWS OF MEMBERS

NEW MEMBERS

The Society welcomes the following new members,
LOUISE ANNIS, Gloucestershire; WILLIAM BLAKE, London; MATTHEW HERBERT, Hants; NORSHIDAH MOHAMED, Malaysia; PAUL O'BRIEN, Ipswich; DAVID PAGET, Cardiff; MOHAMMAD POURZARANDI, Iran; MADJID SHAHRIARI, Iran; PAUL TRUDGIAN, Cornwall; YIN WANG, Glasgow; CLARE WEBSTER, Sheffield;

and Reinstated members,
AJAY PANDEY, India; NICOLA BUCKHURST, Cheshire; EDWARD BUTCHER, Hants; MARTIN KELLY, London;

and the following student members,
ADEL ALRASHEEDI, Edinburgh; KUSHAL THAKKER, Hertfordshire;

Total Membership
2333

NEW ACCREDITEES

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

Admit to the category of Associate Fellow (AFORS)
Hannah SAKAI
Toni WINDER

<OR>

October – December 2012

EDPN 1st Conference
4-5 October 201, Amsterdam http://www.edpn.org/wp/?page_id=199

MEC-VNS 2012 2nd Mini EURO Conference on Variable Neighbourhood Search
4-7 October 2012. Herceg Novi, Montenegro http://www.mi.sanu.ac.rs/~vnsconference2012

ICORD Workshop on Problem Structuring Methods
12-13 October 2013, Tunisia www.informs.org/content/.../file/ICORDWorkshop%20poster.pdf

2012 International Annual Conference of the American Society for Engineering Management
17-20 October 2012 Virginia, USA, www.odu.edu/asem2012

IEEE Global Humanitarian Technology Conference
21-24 October 2012, Seattle, Washington USA, http://www.ieeeghtc.org/

ESM'2012 26th Annual European Simulation and Modelling Conference FOM
22-24 October 2012 Essen, Germany http://www.eurosis.org/cms/index.php?q=node/2112

SCCG 2012 1st International Workshop on Soft Computing Techniques in Cluster and Grid Computing Systems
12- 14 November 2012 Victoria, Canada http://www.fing.edu.uy/cluster/sccg

3PGCIC Seventh International Conference on P2P, Parallel, Grid, Cloud and Internet Computing
12- 14 November 2012 Victoria, Canada http://www.lsi.upc.edu/~net4all/3PGCIC-2012/

GAMEON'2012 The 13th annual Simulation and AI in Games Conference
14-16 November 2012, Malaga, http://www.eurosis.org/cms/?q=taxonomy/term/325

MESM'2012 The 13th Annual International Middle Eastern Simulation and Modelling Conference
10-12 December 2012, Muscat – Oman http://www.eurosis.org

GAMEON-ARABIA'2012 The 3rd annual Pan-Arabic Simulation and AI in Computer Games Conference
10-12 December 2012, Muscat, Oman www.eurosis.org

IEEE 2012 International Conference on Industrial Engineering and Engineering Management
10-13 December 2012 Hong Kong www.IEEM.org

January – March 2013

ORO2013 Second international conference on Operations Research and Optimization
19-22 January 19-22, 2013, Tehran, Iran. http://math.ipm.ac.ir/conferences/2013/ORO2013/

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

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

April – June 2013

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

YOR18 YoungOR18 Bi-annual conference for O.R. careers of less than 10 years.
9-11 April 2013, University of Exeter, UK www.theorsociety.com/Pages/Conferences/YOR18.aspx

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

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

July – September 2013

IMSI0 5 2013 The 5th European Conference on intelligent Management Systems in Operations
3 – 4 July 2013, University of Salford, UK email s.vadera@salford.ac.uk

MISTA 2013
27-30 August 2013, Gent, Belgium http://www.schedulingconference.org/

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

IOR LEGACY FILES ON THE OPERATIONAL RESEARCH SOCIETY WEBSITE

To browse these:

- Go to the Operational Research Society website at http://www.theorsociety.com.
- On the home page, click on left-hand heading **'Membership, Networking, News & Views'.**
- In the right-hand column of the menu that now appears, click on **'Document Repository'.**
- On this page, scroll down (if necessary) to click on **'Enter Document Repository'.**
- Select first category on top bar **'IOR Legacy'.**
- Browse the IOR documents in the list that now appears, reading abstracts and selecting any that you wish to read in full or download.

Documents already deposited in sequence of origin (as at 20 August 2012)**:**

IOR1962Prospectus.doc	Proposal for an Institute for Operational Research
IOR1967FirstFour.doc	IOR: report on the first four years
IOR1969JessopMem.doc	Memorial meeting papers: Neil Jessop, first IOR Director
IOR1970Logimp.doc	Conference papers: the LOGIMP experiment
IOR1971RSAconf.doc	Papers from RSA conference on local government reform
IOR1976Policy.doc	IOR Brochure: new directions in policy & planning research
IOR2011Legacy.doc	Notes on IOR legacy circulated before meeting on future of soft OR
IOR2011Legacy.ppt	Set of 12 PowerPoint slides as presented at IOR Legacy meeting

Further documents to be deposited shortly (target of before 31 October 2012)**:**

IOR1977LinkOne doc	First issue of LINKAGE newsletter on inter-organisational relations
IOR1977LinkTwo.doc	Second issue of LINKAGE newsletter on inter-organisational relations
IOR1978LinkThree.doc	Third issue of LINKAGE newsletter on inter-organisational relations
IOR1979COOR.doc	Papers for OR Society event to explain transition from IOR to COOR
IOR1984Pernambuco.doc	Report on a pioneer strategic choice workshop in north-east Brazil
IOR1988Workshops.doc	A guidance note on facilitation of strategic choice workshops

More recent documents will be deposited by stages later in 2012 or early in 2013.

Documents from the nineteen-nineties and twenty-noughties are expected to be deposited in a variety of file formats, including Powerpoint and .pdf. Most of these later files already exist in these formats, so scanning of printed documents will not be necessary as in the case of files deposited from earlier decades.

REGIONAL SOCIETIES

EAST MIDLANDS (EMORG)

CONTACT: Chris Smith
TEL: 01530 416426
EMAIL: chrissmith677@gmail.com
EMORG - The talk 'O.R. – a virtual reality?'
Date/Time: Tuesday 9th October 2012. The meeting will commence at 6pm, Tea and Coffee will be available from 5.30 pm.
Venue: Loughborough University Business School Room BE1.42
Speakers: Dr Geoff Royston (OR Society President)
The talk 'O.R. – a virtual reality?' will be aimed at stimulating discussion by considering some of the realities of operational research - what its practitioners and academics do and how they can effectively relate, how O.R. is seen and used - or not seen and not used – by managers, and the role of the OR Society in giving – or not giving - its members useful support.
Dr Geoff Royston is former Head of Strategic Analysis and Operational Research in the Department of Health for England, where for almost two decades he was the professional lead for a large group of health analysts. He is now an independent analyst and researcher and is the current President of the Operational Research Society.

LONDON & SOUTH EAST (LASE OR S)

Programme 2012
Location (unless otherwise specified): In the upstairs bar of Ye Olde Watling, on the Corner of Bow Lane and Watling Street nearest stations are Mansion House (Bow Lane exit) and Bank (exit 8) for tube, or Cannon Street and City Thameslink for rail. The event is open to all and with a free buffet of sandwiches available afterwards.
FOR FURTHER DETAILS CONTACT:
Sandra Weddell
TEL: 020 7918 4591,
EMAIL: Sandra.Weddell@tube.tfl.gov.uk
or Martin Caunt
TEL: 020 7215 3317,
EMAIL: Martin.Caunt@dti.gsi.gov.uk

MIDLAND (MORS)

CONTACT: Jen East (Secretary)
EMAIL: MidlandsORSociety@live.co.uk
OR in the 3rd Sector: Improving RNLI Response
Date/Time: Wednesday, 17 October 2012 Time - TBC
Speaker: Stuart Nicholas (Atkins), Kevin Sheehy (Lanner) and Andy Verity-Harrison (FICO)
Venue: TBA
Abstract: TBA

Operational Research techniques applied to Crowd Safety
Date/Time: Wednesday, 21 November 2012 Time - TBC
Speaker: **Prof. Dr. G. Keith Still FIMA, G4S Professor of Crowd Sciences, Bucks New University**
Venue: TBA
Abstract: TBA
This will be a joint talk with the West Midlands branch of the IMA. Please email MidlandsORSociety@live.co.uk if you would like to attend or require any further information.

NORTH WEST (NWORG)

CONTACT: Nathan Proudlove
EMAIL: nathan.proudlove@mbs.ac.uk

SCOTLAND (ORGS)

CONTACT: Mike Pearson (Chair)
EMAIL: m.pearson@napier.ac.uk or
CONTACT: Anthony Swain (Secretary)
TEL: 0131 451 3357
EMAIL: ajs27@hw.ac.uk

SOUTHERN OR GROUP (SORG)

CONTACT: Patrick Beullens
TEL: 023 9284 6357
EMAIL: p.beullens@soton.ac.uk

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.
TEL: 029 2087 5524 Fax: 029 2087 4199
EMAIL: ThompsonJMI@cardiff.ac.uk

SWORDS - Postgraduate O.R. Presentations
Date/Time: Wednesday 10th October 2012
Venue: Mathematics Institute, Cardiff University. Tea and coffee will be available from 5.30pm in the Internet Café which is just inside the main entrance to the Mathematics Institute. The talks will commence at 5.45pm in room M/0.40 (ground floor).

The first SWORDS meeting of the 2012-2013 programme is scheduled for Wednesday the 10th of October 2012. Following on from a similar event last year, a number of PhD students will give brief overviews of their research in Operational Research areas. There will also be an opportunity to meet new students on the MSc in Applied Statistics and Operational Research run by the Cardiff Mathematics Department.

The talks will last approximately one hour after which we will go to a nearby hostelry (venue to be decided) — for networking and free refreshments (meal and drink).

As we need to book the food beforehand, please let me know by the 3rd of October if you plan to attend. Also please let me know if you are a vegetarian or have other dietary requirements.

SWORDS - The talk 'O.R. – a virtual reality?'
Date/Time: Tuesday 13th November 2012
Venue: School of Mathematics, Cardiff University
Speakers: Geoff Royston (OR Society President)

The talk 'O.R. – a virtual reality?' will be aimed at stimulating discussion by considering some of the realities of operational research - what its practitioners and academics do and how they can effectively relate, how O.R. is seen and used - or not seen and

not used – by managers, and the role of the OR Society in giving – or not giving - its members useful support.

Dates for your Diary
Wednesday 12th December 2012 5.30pm, Cardiff University – Professor Jeff Griffiths. The Heathrow Queuing Problem

Tuesday 5th March 2013 5.30pm, Cardiff University – Steve Black and Jon Cook (PA Consulting). Applications of O.R. within health and the pharmaceutical sector.

WESTERN (WORDS)

CONTACT: Dr Jo Smedley
TEL: 01633 432573
EMAIL: jo.smedley@newport.ac.uk
WORDS/SWORDS - The talk 'O.R. – a virtual reality?'
Date/Time: Tuesday 13th November
Venue: School of Mathematics, Cardiff University
Speakers: Geoff Royston (OR Society President)
The talk 'O.R. – a virtual reality?' will be aimed at stimulating discussion by considering some of the realities of operational research - what its practitioners and academics do and how they can effectively relate, how O.R. is seen and used - or not seen and not used – by managers, and the role of the OR Society in giving – or not giving - its members useful support.
WORDS Talk 'Using O.R. to inform learning and teaching developments' followed by AGM
Date/Time: Tuesday 2nd October 2012 Commencing at 5.30pm
Venue: University of the West of England (Frenchay Campus), Bristol.
Speakers: Dr Jo Smedley - More details to follow.
The WORDS/IMA - Is 42 the real answer?
Date/Time: Wednesday January 23rd 2013
Venue: University of the West of England (Frenchay Campus), Bristol.
Speakers: Dr John Crocker
Abstract: Simulation, whether Monte Carlo (MCS), discrete-event (DES) or agent-based (ABS), can be a very powerful and often useful tool but it is not reality. This is especially true when used in conjunction with optimization methods. We shall look at some of the ways the results of a simulation model can lull you into a false sense of security, so to speak.

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: Stuart Johns.
TEL: (0114) 225 3136
EMAIL: s.l.johns@shu.ac.uk

SPECIAL INTEREST GROUPS

COMMUNITY OR NETWORK

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

COMPLEX SYSTEMS DISCUSSION GROUP

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

CRIMINAL JUSTICE

CONTACT: Ian Newsome
TEL. DDI: 01924 292244 **Extension:** 22244
EMAIL: ian.newsome@westyorkshire.pnn.police.uk
CJSIG NEXT MEETING:
Date/Time: Monday 26th November 2012, 2.00pm-4.30pm
Venue: MoJ in central London
There are likely to be three or four speakers covering a range of topics from international benchmarking of justice indicators to the simulation of roster patterns in Crimestoppers' call centre. Further details on speakers and topics will be posted on the CJ sig website and hopefully in Inside OR in the next couple of months so watch these spaces!
Please contact Sue Merchant for more details at suemerchant@hotmail.com

DECISION ANALYSIS

CONTACT: Nadia Papamichail
TEL: 0161 275 6539
EMAIL: nadia.papamichail@mbs.ac.uk

DEFENCE

CONTACT: Noel Corrigan
EMAIL: noel.corrigan@corda.co.uk
ACTING CHAIR:
Alan Robinson
Chief Scientist
PCS Dept,
Defence Science and Technology Laboratory (Dstl)
Portsdown West, Portsdown Hill Road,
Hampshire, PO17 6AD
TEL: 02392 53 2839
EMAIL: arobinson@dstl.gov.uk
OR Society Defence Special Interest Group
Decision Support in the MoD , The presentations will be preceded by the Annual General Meeting of the Defence Special Interest Group
DEFENCE NEXT MEETING:
Comparing Analysis Support for Urgent Operational Requirements to traditional Acquisition Investments – Speed vs Rigour?
Date/Time: Wednesday, 10 October 2012 at 14:00 - 16:00
Venue: Atkins, The Hub, 500 Park Avenue, Aztec West, Bristol, BS32 4RZ
Speakers: Representatives from MOD, Dstl and Industry
Abstract: Operational Analysis support to traditional MOD acquisition and investments has been viewed in some quarters as long winded and delaying to investment decisions. In supporting

Urgent Operational Requirements (UORs), analysis appears to have moved up a gear, but to what extent has this compromised the rigour and certainty of evidence. This event is to explore these issues and identify the lessons for traditional acquisition that arise from the analysis support to recent UORs.
The presentations will be followed by a discussion period where the topics raised can be explored in more depth. This will be followed by tea and biscuits.
Pre- registration: Non-Atkins attendees will need to ensure that they are pre-registered in order to obtain directions and arrange parking. This can be done by contacting:
Sally Skuse - Tel 01454 662611,
Email: sally.skuse@atkinsglobal.com
Further information about the event can be obtained by contacting the following:
Stuart Nicholas, Tel 01252 738528,
Email: stuart.nicholas@atkinsglobal.com
Chris Johnson, Tel 02392 537853, Email: cjjohnson@dstl.gov.uk

FINANCIAL SERVICES

CONTACT: Peter Cohen.
TEL 0207 512 7074.
EMAIL: pcohen@ecgd.gsi.gov.uk

FORECASTING

CONTACT: James Taylor
TEL: 01865 288678
EMAIL: james.taylor@sbs.ox.ac.uk

HEALTH & SOCIAL SERVICES

CONTACT: Thierry J. Chaussalet
TEL: 020 7911 5000 ext 4310
FAX: 020 8911 5187
EMAIL: chausst@wmin.ac.uk

INDEPENDENT CONSULTANTS NETWORK

CONTACT: Hadley Hunter, Chair
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SUPPORTED BY: Colin Elwood
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EMAIL: crelwood@dweomer.co.uk

INFORMATION SYSTEMS

CONTACT:
TEL
EMAIL: email@theorsociety.com

LOCAL SEARCH

CONTACT: Said Salhi (chair)
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EMAIL: s.salhi@kent.ac.uk
CONTACT: Rong Qu (secretary)
TEL: 0115 846 6503
EMAIL: rxq@cs.nott.ac.uk

MATHEMATICAL PROGRAMMING

CONTACT: Katarina Papadaki, London School of Economics
EMAIL: k.p.papadaki@lse.ac.uk or
CONTACT: Giacomo Zambelli
EMAIL: g.zambelli@lse.ac.uk
TEL: 0207 955 7693

O.R. AND STRATEGY

CONTACT: Frances O'Brien
TEL: 02476 522095
EMAIL: Frances.O'Brien@wbs.ac.uk

O.R. FOR DEVELOPING COUNTRIES

CONTACT: Eric Soubeiga
TEL: 020 8659 3265
EMAIL: eric.soubeiga@hotmail.co.uk or
eric.soubeiga@orpagroup.net

O.R. IN THE THIRD SECTOR

CONTACT: Katherine Byrne
EMAIL: katherine.byrne@voa.gsi.gov.uk

PROBLEM STRUCTURING METHODS

CONTACT: Giles Hindle (Chair)
TEL: 01482 463457
EMAIL: giles.hindle@hull.ac.uk
or **CONTACT:** Dr. L Alberto Franco, University of Warwick
TEL: 024 7652 4391
EMAIL: alberto.franco@wbs.ac.uk

PRODUCTIVITY MEASUREMENT

CONTACT: Ozren Despic
EMAIL: o.despic@aston.ac.uk

SD+ (SYSTEM DYNAMICS)

CONTACT: David Lane (Chair)
TEL: 0207 955 7336
EMAIL: d.c.lane@lse.ac.uk
or **CONTACT**: Sally Brailsford (Secretary)
TEL: 023 8059 3567
EMAIL: s.c.brailsford@soton.ac.uk

SIMULATION

CONTACT: Christine Currie
TEL: 0238 059 3647
FAX: 0238 059 5147
EMAIL: christine.currie@soton.ac.uk
or **CONTACT**: Katy Hoad
EMAIL: Kathryn.hoad@wbs.ac.uk

JOURNALS & SPECIAL ISSUE CALL FOR PAPERS

Special Issue
Knowledge Management Research & Practice (KMRP)
Sustainable Quality: Knowledge and Information Management
Further information:
www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013.aspx

Abstract: This Special Issue, in conjunction with KIM2013 (the OR Society's inaugural Knowledge and Information Management conference) is dedicated to the theme of Sustainable Quality. This wide-ranging topic is relevant to organisations and individuals working in any sector of the economy. Knowledge Management has become a key process in understanding organisations and their use of resources and, ultimately, quality is a major differentiating factor when considering goods and services. Sustaining quality requires taking a strategic view that may present short to medium term challenges and knowledge management should be able to help address such challenges. For large organisations, knowledge management may be seen as an intra-organisation activity, but sustaining quality for small to medium enterprises may require inter-organisational cooperation. Papers that relate to the theme and to knowledge and information management will be welcome. Areas of particular interest include (but are not restricted to) the management, practical application, limitations, implications, lessons learned and challenges related to KM and sustainable quality in the areas of services, education, health and manufacturing.

IMPORTANT DATES (in conjunction with key dates for KIM2013)

KIM2013 conference paper titles and abstracts submitted:
7 December 2012
Full conference papers submitted: 11 January 2013
Notification of outcomes of reviews of conference papers: 1 March 2013
Final manuscripts submitted (for conference): 10 April 2013
Conference: 4-5 June 2013
Final manuscripts submitted for KMRP: 1 July 2013
Electronic publication expected in KMRP: 1 September 2013

CALL FOR PAPERS
SIMULATION MODELLING PRACTICE AND THEORY SPECIAL ISSUE ON 'Energy efficiency in Grids and Clouds'
Further information: http://ees.elsevier.com/simpat.

Abstract: Computational and data grids and clouds are large scale distributed systems used for serving very large and complex applications. Grids and Clouds performance became more important due to the tremendous increase of users and applications. However, the usage of energy has become a major concern for grid and cloud computing since the price of electricity has increased dramatically.

IMPORTANT DATES
Manuscript submission deadline: November 30 2012
Manuscript reviews to authors: February 28 2013
Manuscript revision due: May 30 2013
Final notification of acceptance: July 31 2013
Final manuscript submission deadline: August 31 2013
Expected publication of the special issue: December 2013

CALL FOR PAPERS
EURO JOURNAL ON DECISION PROCESSES
Special Issue on Problem Structuring Research and Practice
Further information at: https://www.editorialmanager.com/ejdp/

Abstract: Problem structuring has long been acknowledged as a core modeling activity in the practice of operational research. What is modeled and how influences the way the problem is understood, therefore guiding the actions of individual, groups and organizations. Although there is a significant literature on problem structuring support, much more work is needed in this growing area of operational research and management science. This Special Issue will present important advances on problem structuring research and practice at individual, group and organizational levels.

IMPORTANT DATES
Deadline for the submission of extended abstracts:
November 15 2012
Deadline for the submission of full papers: March 15 2013
Final decision notification: April 30 2014
Publication of the Special Issue: 2nd quarter of 2014

CALL FOR PAPERS
CCPE Special Issue on 'The Internet-of-Things: Shaping the new Internet Space'
Further information at:
http://www.cc-pe.net/journalinfo/issues/2013.html#IOT2013

Abstract: The new version of the Internet Protocol - IPv6 - has astronomically increased the IP address space from around 4.3 billion IPv4 addresses to roughly 340 trillion trillion trillion new IPv6 identifiers. This humongous pool of addresses ensure the continued expansion of the Internet for many decades to come and it realises the vision of everyday objects that are uniquely identifiable and are connected to the Internet – this is commonly known as the 'Internet-of-Things' (IoT).

IMPORTANT DATES
Paper submission deadline: January 15 2013.
The authors will receive initial decision and reviewer comments: April 15 2013.
Final papers: June 15 2013.
Final decisions: July 15 2013.
Accepted papers are expected to appear online for early view within 4 months of final decision.

OR-30

October 1982
(John Crocker)

After a number of 'special' papers in September, we see a return to 'normality' in October with eleven from which to choose. A quick glance indicates a fair number are practical applications with at least three of these written by practitioners from HM Customs & Excise, the Littlewoods Organisation and British Gas Corporation.

Talbot from HM Custom & Excise was concerned with maximizing the recovery of under-declared VAT by better utilization of the 4000 staff who visit around 400,000 of the 1¼ million traders each year. This was done essentially by ranking each of the traders into one of seven risk [of under-declaring] categories based on amongst other factors, their size, turnover and type of business. During 1978 and 9, the level was a little over £1 million per week of recovered under-declarations but during 1980 and the first half of 1981, the rate had climbed to above £2.5 million per week. Unfortunately, the OR group could not claim responsibility for all of this increase as the rate of VAT had also increased from 8% and 12½% to 15% during the same period. After allowing for this, it was estimated that by ranking the traders and then targeting the right ones had produced a 'productivity' improvement of around 20% (per member of staff). The paper does not indicate how much of a pay rise the 4000 staff received. (During the late 70s and early 80s, the country was going through a period of high inflation and pay rises, at least in the private sector, had to be justified by improved productivity, as I recall.)

At another of the UK's large organizations, J.C. Russell was concerned with the optimum policy for replacing vehicles within the British Gas Corporation (BGC) in the days when it was a nationalized industry. At the time, BGC owned around 22,000 commercial vehicles (customer service and distribution vans) and some 2000 cars (primarily for sales people and senior management when a company car was worth having). BGC were spending around £21 Million pa on new vehicles with a typical vehicle costing £2213 (before discounts). Although much work went into calculating maintenance and repair costs, there appears to have been no attempt to look at the relative reliabilities of the different makes and models. Despite all of the work which went into this to calculate labour, materials, downtime and standby costs the conclusion appears to have been replace cars every 3 years, small vans every 5 years and larger vans every 6 years.

David Kohler, University of Nairobi, looked at the standard game of darts (i.e. 301). In his paper he ranks players into 5 classes (A-E, Excellent to Poor) based on their likelihood of hitting the inner or outer bull or landing within the treble ring (when aiming at the bull). An excellent player, by this classification was one who had a greater than 30% probability of being within 5/8' (approx 18 mm) of the centre of the board (when aiming at the bull, i.e. within the outer bull) whereas a poor player was one who was less than 70% likely to be within 3¾' (approx 95 mm) of the centre (i.e. the inner treble ring). One of his findings, rather interestingly, was that there was no apparent difference between one's lateral and vertical aims – poor players are usually advised to aim high and hope it will drop in.

For an excellent player who has a double to remaining, the recommendation is to aim the first two darts at the outer double wire and then the last dart at the centre of the double sector (if they miss with the first two). By contrast, for a poor player, the best policy is generally to aim well outside the double (i.e. off the board) with first, a bit closer with the second and at the outer wire with the third. Kohler actually lists every 3-dart strategy for every score for all five grades of player. Note: the outer double ring is 6 5/8' (approx 168 mm) in diameter.

Talbot, C.R.S., 1982, Operational Research and the Control of Value Added Tax, *JORS* 33.10, Pp 885-890 (jors1982192a.pdf)
Russell, J.C., 1982, Vehicle Replacement: A Case Study in Adapting a Standard Approach for a Large Organisation, *JORS* 33.10, Pp 899-911 (jors1982194a.pdf)
Kohler, D., 1982, Optimal Strategies for the Game of Darts, *JORS* 33.10, Pp 871-884 (jors1982191a.pdf)

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OR-20 Extracted from OR Newsletter October 1992

LEADER
O.R. in a Cold climate
The Oracle

This year I experienced particular difficulty in clearing my work diary and resolving knock on effects upon family life in order to attend the annual O.R. conference at Birmingham during what would normally be an off peak period. Evidently I was attempting too much. Such problems are, I believe, symptomatic of a general increase in pressure upon UK academics, and particularly upon O.R. academics. This is a theme I wish to return to on another occasion since if it continues, there will be implications.

It must have been some two years ago when some perceptive person asked a group of managers why it appeared half the population isn't working, whilst the other half have to work 150%? Nobody attempted an answer on that occasion, but the question itself was greeted with a chorus of 'hear hear'. Though the figure

quoted has no specific validity or authority, the situation raised by the question was evidently and immediately recognised by the assembled company.

Two years on, I doubt if the position has changed much, through membership of the working and non-working sets has. Early retirements, restructuring and company collapses, (usually though not always properly, attributed to the recession) have taken their toll. The O.R. community has not been spared. A number of industrial O.R. groups have, for the time being at least, ceased to exist in a recognisable form whilst others have survived. It is, I suggest, important to understand both how and why.

In times of economic stress when an organisation may need to contract within a short time span, be it a manufacturing company, a government department or multinational, tough decisions have to be made. In such circumstances, the perceived soft target, the less essential, and the least politically supported are amongst the most vulnerable.

It is a matter of concern to me that in a number of cases, the resident O.R. group has seemingly been amongst the earlier casualties in some organisations. There would be less concern on my part had it been virtually amongst the last, after having made an impact upon the rationalisation process. Even then, unless the organisation really believed it could prosper without some management research capability, shouldn't O.R. still be evident in some form or another? Such a view does, of course, presuppose that the O.R. group is capable of a research function and of tackling topical and strategic issues. It also presupposes the group is recognised as having these capabilities.

At the time of writing, I am unaware of the number of O.R. groups that over the past two years have ceased to function as groups. All I know is that the number is at least five. There have been notable survivors of O.R. within industries, albeit sometimes in a different format. The steel and coal industries are cases in point along with Rolls Royce and British Airways.

I suggest it is the Society's interest to contemplate some timely O.R. on itself and investigate and understand the mechanisms of survival and demise of O.R. Groups over recent times. There may well be implications for the heads of O.R. Committee (HORC), the teaching of O.R., and the O.R. Society itself. Perhaps HORC might be interested in considering the problem, and a useful contribution could arise from a Masters student project. My hunch at this stage is that there is no single or simple explanation, but that the concept of image raised by Paul Thornton may be relevant.

Suffice it to say that having created the opportunity to attend the conference, I hope to start collecting relevant experiences of some survivors and, perhaps, some victims.

Tony Christer

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London or Bucks

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

London

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Our client seeks outgoing individuals from analyst to senior analyst level, to take up key risk modelling roles within their Intelligence and Planning team, focussing on risk and safety data analysis activities. Candidates will need an impressive honours degree in a numerate discipline, proven experience in quantitatively structuring abstract problems, demonstrable mathematical modelling ability, together with associated technical expertise (particularly Excel). **London**

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South Wales

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Enviable opportunity for an accomplished OR professional to expand the current analytics, modelling and optimisation capability of this leading travel group. You will be responsible for the definition and delivery of their Yield Blueprint – defining the science, algorithms, methods and approaches to ensure they maintain a state-of-the-art/competitive yield management capability. You will be MSc and/or PhD qualified with 3+ years experience of working with in an analytical and modelling environment, have expertise in forecasting and/or optimisation methodologies, and expertise in either MATLAB or C++. Strong influencing/interpersonal skills essential. **Peterborough**

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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