THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

JANUARY 2014 NO 517

AWARDS AND MEDALS

: : INSIDE THIS MONTH : : : : :

How membership of The OR Society will help your career path

EDITORIAL

JOHN CROCKER

This year sees the inauguration of the 31st President of the OR Society, Professor Stewart Robinson – we wish him every success. Dr Geoff Royston provides a most interesting synopsis of what has happened within the Society during his two-year presidency and where he hopes this will lead.

One of his last official duties was to present the awards at the annual Blackett Memorial Lecture before introducing this year's guest lecturer. The eight awards were presented to fourteen recipients (details of each can be found elsewhere within this issue). The 14 are: Kevin Glazebrook (Beale); David Ryan (Companion); Philipp Kemmer, Arne Strauss and Thomas Winter (Goodeve); Hope Koch, Ester Gonzalez and Dorothy Leider (Stafford Beer); Csaba Boer and Saanen (Tocher); Tony Lewins, Simon Mardle and Louise Fildes (President's); Kabir Rostogi (Doctoral Award) and Gary Preece (Cropper). Congratulations to one and all.

This year's guest lecturer was David Spiegelhalter who gave a most interesting and entertaining talk entitled 'Communicating Risk' in which he introduced the concepts of 'micromorts' – one death per million miles/hours/events – used to compare acute risks (e.g. accidents) and its counterpart, the 'microlife' which represents approximately half an hour and is used to compare chronic risks (e.g. smoking, eating, drinking and breathing). The event was particularly well attended to the point that Hilary had to organise a new, higher capacity venue at very short notice (no mean feat in London just before Christmas).

For those that missed the Blackett Lecture, it can be seen on http://tinyurl.com/ot428d4

As mentioned last year, the OR Society had its 60th birthday in November and we are continuing with this theme. This month we have contributions looking at the role of our publications and how social media is taking an ever-increasing part in the life of the Society. Louise provides us with another fascinating look into the life of a young operational researcher and sets her readers a problem to get their minds back into gear after the Christmas break – the most entertaining solutions will be published in the spring.

As it happens, the O.R. Department at Lancaster University celebrated its Golden (50th) Anniversary recently. Lancaster is to [O.R.] Presidents as Eton is to Prime Ministers and there was certainly no shortage of them at the celebrations according to Graham Rand's account. Although I am not an alumni of Lancaster University, I do have some great memories of the two weeks I spent at Bowness-on-Windermere attending a Lancord course on O.R. in the early 1970s.

Whilst on the subject of past presidents, in the article on Lord Halsbury it was stated incorrectly that P.M. Morse was a past President. I am indebted to Jonathon Rosenhead for bringing this to our attention. I can only apologise for not checking the facts before going to press. As of the 31 December 2013, I shall be officially retired so will perhaps have more time to check such things in the future (deadlines permitting, of course).

Continuing this series on the great men and women of O.R., this month we take a closer look at Stafford Beer. By coincidence, one of his papers was also published in JORS exactly 30 years ago so it seemed natural to use this as the subject for *OR -30.* Stafford was an interesting character who gave the appearance that he would have fitted in well into a hippy commune as I recall from the few times that I met him.

May I, on behalf of the team, wish you all a very happy and prosperous New Year.

<OR>

CONFERENCE NEWS

EVENT:	Beale Lecture 2014	**DATE:**	27 February 2014	**VENUE:**	Royal Society, London
EVENT:	SW14	**DATE:**	1 – 2 April 2014	**VENUE:**	The Abbey Hotel & Golf Club, Worcestershire
EVENT:	OR56 Annual Conference	**DATE:**	9 – 11 September 2014	**VENUE:**	Royal Holloway University of London, Egham.
EVENT:	EURO2015	**DATE:**	12 (welcome), 13 – 15 July 2015	**VENUE:**	University of Strathclyde, Glasgow

PUBLISH OR BE DAMNED

JEFF GRIFFITHS, CHAIR OF PUBLICATIONS COMMITTEE

The importance of the Society's journals to the daily work of members varies, but our publications represent an achievement from which we all benefit, and of which we should all be proud.

The first journal, then known as the Operational Research Quarterly, was published in 1950 by the O.R. Club (i.e. before it became a 'Society'). In that first volume of four issues, there was a total of sixteen articles including papers, editorials, abstracts and sundry other items with a page count of 72. For the Silver Anniversary of the Quarterly, now renamed the Journal of the Operational Research Society (*JORS*), there were twelve issues with 195 articles, mainly papers, and the page count had reached 894. The following year the page count broke the 1,000 barrier. In 2011, the page count peaked at a massive 2,204, settling back to 1881 in 2013.

In 1988 the Journal was joined by *OR Insight*, aimed at providing an outlet for case studies written in a style that would make them more readable for a non-specialist audience. Three years later the *European Journal of Information Systems* (EJIS) was launched. In 2003, *Knowledge Management Research and Practice* (KMRP) appeared for the first time with some 235 papers published in its first ten years. Three years later, the *Journal of Simulation* joined the portfolio, followed last year by *Health Systems*. Excluding *International Abstracts in Operational Research,* which is only available electronically, the Society published a staggering 4,406 pages in 2013.

The journals help define the subject area for researchers and others working at the leading edge of the profession. They provide an essential platform for the dissemination of the latest research findings – originally essential because they were the only way of disseminating findings, and now in this age of Wikipedia and Google, essential because of the value and assurance provided by the peer review process, and the reliability of the archive many years on. They provide credibility and authority for the profession when our voice needs to be heard amongst educators at all levels, from secondary school to post-doc. And they provide a resource for people working in all areas of O.R. and associated professions, whenever the need arises.

At the same time, they also provide the Society with the major source of its income, at present about 60% of the total without which the OR Society would not be able to undertake much of its other work, such as O.R. in Schools, free Regional and Special Interest Group meetings, or much of the charitable research work it funds.

We are indebted to a small army of volunteers and professionals for this achievement. The publications committee of the OR Society, the peer reviewers, editors and editors-in-chief who receive little or no financial reward, Palgrave our publishers and all of those stalwart people in the OR Society office all play a crucial part in the process.

So what of the future? No organization can afford to stand still, and the OR Society is no exception. Work is currently underway to determine the business case for a magazine-style publication, which will focus on applications, in the form of 'impact' articles primarily aimed at disseminating the latest developments to practitioners and non-members who might benefit from a better understanding of what O.R. is all about. The magazine will be a replacement for *OR Insight* which has, alas, now ceased publication.

In addition, the Society is looking into the viability of providing a new platform for supporting and promoting developments in the field of Analytics and Big Data. At the same time, the OR Society is very aware of the Government's and Research Councils' desires to move towards Open Access (OA), in which research findings are made freely available to all and sundry with publication part-funded by the research grants. This is likely to have a major impact of this revenue stream and, unless, an alternative source of income can be found, could have serious implications on services that the OR Society (and, of course, all other learned societies) can provide.

'The journals help define the subject area for researchers and others working at the leading edge of the profession.'

HOW TO WIN FRIENDS AND...

FRANCES SNEDDON, SIMUL8 CORPORATION

In the last 60 years one of the greatest successes of the OR society has been its ability to connect and foster relationships and collaborations between O.R. professionals.

It has ensured we have exchanged ideas, enhanced professionalism in our field and promoted our successes. It has been critical in getting the world to understand the contribution that O.R. makes and in furthering our reach so that we can do more.

All this has been achieved using traditional vehicles: newsletters, events, emails. Now the OR society is accelerating its efforts using the latest social media technologies. Social media is a tool of communication, of sharing and engagement. Its power is in the millions who use it every day and its ability to reach us anywhere, at any time, on our schedule. The end user is in control, that is a large part of why the world has embraced it as their preferred way to digest information. Social media can help the OR Society further deliver on its aims, to support O.R. professionals and to increase awareness of O.R.

We are using social media to connect with our users to ensure they have all the relevant information about the latest O.R. and analytics activities throughout the world. Twitter, Google+, Facebook are all places where we are researching what is happening and then sharing it with our O.R. community. We are using it to facilitate discussions between O.R. professionals. On our LinkedIn group you can get the support of over 3,000 O.R. professionals in an instant, ask them a question and get the views and opinions of the O.R. elite. By using all of these channels we are reaching new individuals, even those who are unaware they are embarking on O.R. activities. We are enhancing our existing personal connections and creating a new O.R. world of relationships, an online world.

Get involved at:

@TheORSociety

The OR Society

<OR>

JAM TOMORROW

CERI COOPER, FOOD STANDARDS AGENCY

Grants available from ESRC and FSA

The Economic and Social Research Council (ESRC) and the Food Standards Agency (FSA) have come together under the auspices of the Global Food Security programme, to jointly fund four to six research grants relating to understanding the challenges of the food system. Joint funding of up to £1.87 million at 100 per cent full economic costing (fEC) is available for this call.

The UK food system is embedded in a wider system that is increasingly globalised and seemingly prone to periodic scares and crises. The FSA and ESRC have identified an area of mutual interest around the challenges that this presents to the UK agri-food system, food safety, food fraud/crime and consumer trust. The funders are keen to support research around the safety and confidence effects of different approaches to food provision, supply chain management and organisation, and how any findings might lead to policy interventions and influence consumer, regulator and industry behaviours.

Timetable:

Call opens - 27 November 2013

Call closes - 16.00, 30 January 2014

Panel decision meeting - w/c 28 April 2014

Decisions - May 2014

http://tinyurl.com/ldrmdc8

<OR>

CALLS FOR PRACTITIONER CASE STUDIES AND POSTERS

The OR Society Simulation Workshop 2014 (SW14) will be held on 1-2 April 2014 The Abbey Hotel Golf and Country Club, Worcestershire, UK.

We now call for Practitioner Case Studies and Posters:

The **Practitioner Case Studies** serve as a multidisciplinary forum for industrial professionals to share what they have learned when modelling real world problems using simulation. The applications are open to all areas including manufacturing industries, service industries, healthcare, transportation, financial industries, tourism industries, among others.

The session will consist of 30-minute presentations (including questions and answers). The presentations should focus on a specific problem where simulation was utilised to conduct an analysis and provide recommendations for potential solutions.

The intention of this session is for industrial professionals from the company or organisation where the simulation case study is conducted to present the case study.

Interested case study presenters should submit for consideration, **a title** and a **300 word maximum abstract**, to the Practitioners Case Study stream via www.theorsociety.com/SW14. The 300 word abstract should describe, at a minimum, the problem, the simulation methods used, the results, and the impact/benefits of the case study. Submission information can be found on the SW14 website under Papers, Posters and Submissions. Please also use the files under Workshop Author Guidelines for formatting help. Submission implies that an author will register and pay to attend the conference.

The abstracts will be reviewed and those case studies selected for presentation will have their abstract appear in the final programme of SW14.

Important Dates:

- Deadline for abstract submission, 14 February, 2014
- Author notification, 28 February, 2014

Please contact s.onggo@lancaster.ac.uk or cathal.heavey@ul.ie for more details.

Call for Posters: Practitioners, researchers and PhD students in the field of simulation are invited to submit a poster to SW14. Submitting a poster provides an opportunity to showcase your simulation research or applied work throughout the entire conference. A poster session also allows delegates to briefly summarise their work, challenges in the use of simulation and their contribution.

Posters should summarise an applied simulation case study or a novel research project within the field of simulation. Contributions are welcome from all application domains and simulation techniques; e.g. Discrete-Event Simulation, System Dynamics and Agent Based Simulation. Authors are free to submit posters of work in progress.

Authors must submit for consideration, **a title** and a **150 word maximum abstract** to the Posters stream via www.theorsociety.com/SW14 before **14 February 2014**. Submission implies that an author will register and pay to attend the conference. Authors are responsible for printing and bringing their own poster to the conference. Poster guidelines and submission instructions can be found here: www.theorsociety.com/Pages/Conferences/SW14/SW14Papers.aspx

Please contact Tom Monks (t.monks@exeter.ac.uk), for more details.

<OR>

We are grateful to the following organisations for their sponsorship of SW14. If you would like to sponsor this event, please contact hilary.wilkes@theorsociety.com

[dstl] dse CONSULTING LANNER

palgrave macmillan saker solutions SIMUL8

enabling better decisions

Set your career on a course with LSC...

LSC Group is a leading Technical Consulting and Information Technology company operating primarily in the UK Defence and Energy markets. We deliver independent consultancy and information systems to enable organisations to maximise their return on capital projects and deliver on their business objectives.

LSC has a track record in delivering decision support solutions to its clients, applying mathematical and analytical methods to provide insight, analyse options and make informed recommendations. We are seeking to recruit a Managing Consultant to lead the development and growth of our Information Exploitation Group.

Information Exploitation – Group Lead

The Information Exploitation Group Leader has responsibility for developing and delivering consultancy services across modelling and simulation, business intelligence, and data analytics. You will develop and grow a team of consultants, and have considerable opportunity to demonstrate entrepreneurial flair and sound business acumen.

The successful candidate will be educated to MSc or PhD level in an appropriate engineering or science-based discipline or equivalent.

In conjunction with a strong academic background, we would be interested in seeing candidates who have experience and skills within:

- Leading and developing Stochastic modelling and/or advanced analytics
- Developing and winning business, particularly in the fields of modelling and advanced analytics
- Requirements elicitation
- A consultancy environment particularly in the areas of modelling and simulation and/or data analytics
- Problem structuring methods
- Technical leadership of teams
- MS Office applications and software tools for modelling and analytics

Due to the nature of the work LSC Group undertake we will require successful candidates to gain UK Security Clearance.

To apply please send your CV and a covering letter to Hannah.Wildgoose@lsc.co.uk

A member of Babcock International Group

For further information on LSC and all our vacancies please visit www.lsc.co.uk

THE OR SOCIETY
DIAMOND JUBILEE
60 YEARS OF BETTER DECISIONS
1953 2013

BEALE LECTURE 2014

Open event - Thursday 27 February 2014

This OR Society event begins with a short talk from our 2011 OR Society Doctoral Award winner, Richard Wood, followed by our main speaker and 2012 Beale Medal Award winner, Mark Elder.

The main lecture will be given by **Mark Elder** (founder of SIMUL8 Corporation) who won the Beale Medal in 2012.

The OR Society's Beale Medal is awarded each year in memory of the late Martin Beale. It gives formal recognition to a sustained contribution over many years to the theory, practice, or philosophy of O.R. in the UK, or to some combination of those areas.

Mark Elder

Mark has made a significant difference to the use of operational research methods, particularly in simulation, through his research, teaching and the software companies that he founded. He is a worthy recipient of the Beale Medal.

Mark Elder receiving his award from Geoff Royston, President of the OR Society.

He first studied Operational Research at Lancaster University from where he graduated in 1978 with a BSc. He started his career in the automotive company British Leyland in the UK, simulating the introduction of new car derivatives to existing plants. In the late 1970s he was one of the team who created SEE-WHY, the world's first Visual Interactive Simulation software. Mark then went on to help found the simulation company Insight Logistics which developed the GENETIK simulation software package.

Mark has been a pioneer in the field of visual interactive modelling and simulation, obtaining his doctorate for research in this field from the University of Strathclyde. He spent some time as an academic teaching and conducting research on simulation at the University of Strathclyde.

In 1994 Mark founded SIMUL8 Corporation and has been CEO until announcing his retirement in 2012, though he will continue as Chair of the Board of Directors of the company. The SIMUL8 software has had a significant impact on the field of simulation. For the first time it provided readily affordable simulation software which has been widely used in industry and the public sector both in the UK and overseas. Through SIMUL8's educational licences and support for academics, simulation has been introduced to thousands of undergraduate and postgraduate students across the world. Mark's vision is that everyone working in any process should be thinking about how to improve it - by simulating their own ideas for change. He has gone a long way to achieving that vision.

Mark has been an influential speaker at many events in the UK and overseas. He was a plenary speaker at OR49, the Society's Annual Conference in Edinburgh in 2007. More recently he was one of the invited speakers to the Society's Developments in Advanced Analytics event that took place in London in April 2012. Mark has also served the Society by being a member of Council and he is currently a member of the Accreditation panel.

Richard Wood receiving his award from Geoff Royston, President of the OR Society.

PhD winner, Richard Wood

The prize, for the 'Most Distinguished Body of Research leading to the Award of a Doctorate in the field of O.R.', is an annual one, with the award being announced at the OR Society's Annual Conference in September.

The winner of the 2011 OR Society Doctoral Award was Richard Wood from Cardiff University. His PhD project detailed in his thesis was entitled 'Modelling activity at a neurological rehabilitation unit' and was undertaken in collaboration with the National Rehabilitation Hospital for Wales. He developed a multi-server queuing model for this hospital incorporating intensive treatment. His model was used in combination with a multi-objective optimisation procedure that produces the treatment intensity levels by matching patient demand with staff supply.

The external examiner commented that the new insights in Richard Wood's thesis were impressive and his work had made a major impact in the function of the hospital unit. Richard worked closely alongside hospital staff while he was doing his Ph.D. to ensure that the model would be used and be of benefit to the hospital's organisational processes.

The external examiner also found the thesis was a 'pleasure to read' and the content was presented in an eloquent manner. The awards panel was impressed with this type of research which used appropriate theory to help provide a real-life 'practical' application.

<OR>

THURSDAY 27 FEBRUARY 2014

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

Lectures start at 3.00pm

(Tea and biscuits at 2:30pm; Lectures finish around 4:30pm)

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

GOLDEN DAYS AT LANCASTER

GRAHAM RAND

A cornucopia of OR Society Presidents were present in Lancaster, well there were six, at the end of September, as 50 years of Operational Research at Lancaster University was celebrated with over 100 alumni, staff and guests.

Current OR Society President and President-Elect join the lunch queue

It was on 1 October 1963 that Pat Rivett took up his chair at Lancaster University, the very first professor in the University. At the time he was President of the Operational Research Society. It was great to see so many alumni back, and it was clear from their reactions that they had enjoyed the day. They greatly enjoyed anecdotes and memories of particular people and places, as well as the shared experiences of the rain, the weather and sheep! It was interesting to hear about the way that advances in technology and changes in society had affected the student experience over the years.

The programme for the day was in three parts. In the morning the University archivist talked about how the University had come to

Prof. Alan Mercer

Lancaster and Graham Rand talked about how O.R. had come to the University. He showed a short clip of Pat Rivett on prime time BBC television from October 1963, and played part of a recording of an

Graham Rand addresses the meeting

Robert Dyson in full flow

interview with Pat describing how he came to Lancaster. The morning ended with some reminiscences by Peter Checkland.

After lunch, Head of Department Richard Eglese (President OR Society, 2010-11) described developments in the Department over the 50 years, illustrating his talk with a memorable (for some) pop song from each decade, before specific talks on teaching (Linda Hendry), research (Mike Pidd, President OR Society, 2000-01), and external links (John Ranyard, President OR Society, 1988-89). Not only is John an alumnus of the Department (PhD, 1972), but for several years he was our external liaison officer. Some concluding remarks were given by Geoff Royston (former external examiner and current President, OR Society).

In the final session former students, one from each decade, talked about what it was like for them. The five alumni speakers travelled

More lunch-time networking

from Canada, New Zealand, Scotland and also England to be with us. Their interesting stories included sharing perspectives from Peru and India. The day was wrapped up by Alan Mercer, a founding member of the department.

In the evening invited guests enjoyed a dinner, at which it was a pleasure to welcome Pam Simpson, Mike Simpson's widow. Mike (President OR Society, 1978-79) was the third founding member of the Department, alongside Pat Rivett (President OR Society, 1962-63) and Alan Mercer. Robert Dyson (PhD 1969 and President OR Society, 1998-99) concluded the evening with a short speech.

Those of you who are counting will note that only five Presidents present have been named. The sixth was Val Belton (MA, 1978 and President OR Society, 2004-05). And whilst on the presidential theme, Vicky Mabin (PhD, 1981), a former president of OR Society New Zealand (1990-91), had travelled to be with us. It was a very happy day, with many taking this wonderful opportunity to reminisce and reconnect.

<OR>

SPECIAL INTEREST GROUPS

CRIMINAL JUSTICE

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

Criminal Justice SIG meeting
CJ sig autumn meeting
Date/Time: Monday, 24 February 2014 – 10.30 - 13:30
Venue: Home office, London

Details on CJ sig website.

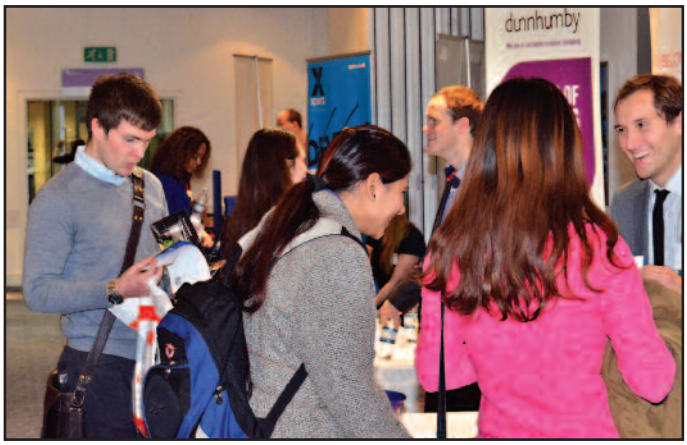
Please contact Sue Merchant as soon as possible if you are interested in attending at suemerchant@hotmail.com

<OR>

CAREERS OPEN DAY 2013

LOUISE ORPIN, EDUCATION OFFICER

Thank you to all of the exhibitors and everyone who attended the Careers Open Day in November, you made the day a success.



2013 was all about new things for the Careers Open Day, a new venue, new exhibitors and a new programme. The venue at Millennium Point in Birmingham made a great setting for the day, even the rain (yet again!) and an accident on the M40 did not dampen our spirits. Increasing the number of exhibitors compared to previous years helped to showcase the diversity that one can experience in a career in O.R. This is what the day is all about and attracting organisations who had not exhibited with us before helped to achieve this. The new programme experimented with splitting the attendees into two groups and repeating the talks so that while one half were listening to the talks the other half would be in the exhibition. This was designed to ensure a constant flow of visitors for the exhibitors which allowed them to have more time to speak with individuals. I'm looking forward to next year already and how we can make it even better!

The attendees are asked to complete a feedback questionnaire to help us improve the event. As an incentive we offer an Amazon gift voucher for two people picked at random. I'm pleased to announce that this year's winners are Svenja Andresen from the University of Manchester and Alex Young from Aston University.

<OR>

The 2013 exhibitors were:

Admiral, British Airways, British Gas, Capgemini, Cardiff University, CORDA, Delivering Successful Futures, datatech analytics, [dstl], dunnhumby, EY, GORS, IBM, Lancaster University Management School, NATS, ORH, Prospect Recruitment, pwc, RBS, SIMUL8 Corporation, sparx, steer davies gleave, University of Southampton, TESCO, University of Westminster

PLANNING FOR A SUCCESSFUL OR56: HOW YOU CAN HELP

OR56: 9-11 SEPTEMBER, ROYAL HOLLOWAY UNIVERSITY OF LONDON

Making a contribution to the success of an OR Society annual conference is a very rewarding experience. The Christmas holiday and new year period is the ideal time to think about the ways that you and your organisation can help to make OR56 another highly successful conference:

Organise a Stream:

OR56 is being co-chaired by Andy Verity-Harrison of FICO AndyVerityHarrison@fico.com and Giles Hindle of the University of Hull giles.hindle@hull.ac.uk

We would be very pleased to hear from any Special Interest Group organisers who would like to run a stream at OR56.
We would also be very pleased to hear from anyone else who would like to offer to organise a stream.

Either of our co-chairs would be very pleased to hear from you and discuss what's involved. So do get in touch for a non-committal discussion, with them or with Hilary Wilkes on hilary.wilkes@theorsociety.com, so that you're ready for when the submission system opens in January.

A brief outline schedule for stream organisers is:-

From now to 14 June 2014: Solicit presenters for the stream (main effort)
June 30 2014: All abstracts to be submitted via the website.
July 2014: Organise session chairs.

We hope you will be presenting at OR56!
A brief outline schedule for presenters is:-

Jan 2014 Submissions system is open.
14 June 2014 Deadline for submission of Keynote Papers + Extended Abstracts
14 June 2014 Deadline for submission of Titles and Abstracts
21 June 2014 Notification of Acceptance sent for Keynote Papers and Extended Abstracts

(All dates may be subject to change)

Sponsor and/or exhibit

The conference is a great place to meet lots of O.R. academics and practitioners. You can promote your services, speak directly with people and find out more about what they really need.

Perhaps you could make yourself better known as a consultancy in the field. Or maybe offer software or other products which will help O.R. analysts solve their problems.
If you exhibit at OR56 you will make contacts and might meet future business partners or employees. If you provide sponsorship of a specific item then your name will be in front of everyone.

Whether you exhibit or sponsor, your details will appear on the website, in general conference information and in *Inside O.R.* each month.

In the last two years there have been over 300 people at the conference. These have been fairly evenly split between academics and practitioners.

For more information about sponsoring or exhibiting, just contact Hilary.Wilkes@theorsociety.com to find out more about how you can make the most of these opportunities.

<OR>

Royal Holloway University of London

THE ORIGIN OF ROYAL HOLLOWAY UNIVERSITY

Royal Holloway's founder Thomas Holloway was a self-made multi-millionaire who made his fortune in patent medicines.

In 1837, he started advertising his first remedy – Holloway's Universal Family Ointment. Two years later, he started making digestive pills and moved to large premises. His business in patent medicine continued to expand thanks to Holloway's grasp of publicity in an era where newspapers were springing up in Britain and the rest of the world.

By 1879, Holloway had more than enough money to initiate a public debate inviting suggestions as to 'How best to spend a quarter of a million pounds or more'. It was his wife Jane who suggested a college for women as the means by which Holloway's money might create the 'greatest public good'. Royal Holloway was born.

The Royal Holloway College building was largely inspired by the Château Chambord in the Loire Valley and was opened by Queen Victoria in 1886.

MATHEMATICAL SCIENCES IN SET FOR BRITAIN 2014

DAVID YOUDAN, COUNCIL FOR THE MATHEMATICAL SCIENCES

This is the final call for Mathematical Sciences posters for the Parliamentary and Scientific SET for Britain competition. After the three calls we have twenty-five abstracts and we are hoping that this number will be closer to sixty.

With thanks to the Parliamentary and Scientific Committee, the Clay Mathematics Institute and the Council for the Mathematical Sciences we are introducing the Mathematical Sciences to SET for Britain 2014. Within the mathematical sciences - mathematics, statistics and operational research, three posters will be selected to be the winners. (First prize (gold award) - a medal and a cheque for £3000; the second prize (silver award) a cheque for £2000 and the third prize (bronze award) is a cheque for £1000.)

We are looking for posters which best communicate high level mathematical science to a lay audience. Fortunately, following the Deloitte Economic Impact report[1], we have clear indications of the many parts of the mathematical sciences that will be of interest. Full details of the competition and how to apply can be found at: www.SETforBRITAIN.org.uk.

Please ask your early career researchers to submit a poster. [Early-stage researchers include university research students, postgraduates, research assistants, postdocs, research fellows, newly-appointed lecturers, part-time and 'mature' students.]

Together we will be able to bring the mathematical sciences within this highest profile STEM event. This is a major opportunity to influence key decision makers in Whitehall.

Please note that abstracts should be submitted through the official website before 20 December 2013.

Successful applicants will be asked in the New Year to develop their abstract into a poster and must be available to present in the House of Commons on Monday 17 March 2014.

Best wishes

Presidents of:
IMA - Robert MacKay
LMS - Terry Lyons
OR Society - Geoff Royston
RSS - John Pullinger

[1] Measuring the Economic Benefits of Mathematical Science Research in the UK
http://tinyurl.com/cab6ex8

Outline Details from the Parliamentary and Scientific Committee concerning the SET for Britain Competition

The overall aim of SET for BRITAIN is to encourage, support and promote Britain's early-stage and early-career research scientists, engineers, technologists and mathematicians who are the 'engine-room' of continued progress in and development of UK research and R&D, and ultimately of UK plc. Many will be Britain's future scientific and technological leaders and others will clearly be leaders in other fields. Such researchers are a vital asset and investment for the UK.

Mr. Andrew Miller MP, Chairman of the SET for BRITAIN organising group of the Parliamentary and Scientific Committee, will sponsor an exhibition and reception in the House of Commons Terrace Marquee on Monday, 17th March 2014 during National Science and Engineering Week.

In order to encourage maximum participation by early-career researchers and Members of Parliament the competition is divided into five subject areas:

- Biological and Biomedical Science
- Chemistry
- Engineering
- Mathematics
- Physics

There are 3 two-hour poster exhibitions and judging sessions during the day, ending with a reception and prize-giving. It is expected that there will be about 60 posters on display in each session, representing the best in each field as part of a national competition for a prestigious Medal and substantial monetary prizes.

SET for BRITAIN Awards are made on the basis of the very best research work and results by an early-stage or early-career researcher together with their ability to communicate their work to a lay audience.

<OR>

OAKS FROM ACORNS

JOHN CROCKER

The *NewScientist* (16 November 2013) argues the point for and against open data.

Nigel Shadbolt and Tim Berners-Lee

When Twitter was launched onto the stock market, it was valued at a staggering $18 billion even though it has yet to make any profit. Big Data is not just big in quantity, it is big in value. As the article points out, each item of data is virtually worthless to the individual (who effectively has donated it), to the companies such as Google and Twitter and to governments but, when it is all put together it is almost invaluable.

In an interview with Nigel Shadbolt, Professor of Artificial Intelligence, University of Southampton and co-founder (with Tim Berners-Lee) of the Open Data Institute, he notes that Open Data is allowing small agile companies to create services that people want. They are already 'incubating' 10 start-up companies.

The first of these to achieve a level of success is Mastadon C which has been looking at public data to identify the habits of doctors in the prescription of cholesterol lowing drugs. It has been estimated that the NHS is likely to save £200 million a year if doctors switch from branded to generic drugs in this area alone.

Another of their companies has developed an app that allows users to adjust their journeys to avoid delays by looking at data from all the various public service providers (bus, train, underground, ferry and tram services). This is working particularly well in London where millions of journeys are being re-routed saving an estimated £58 million a year in the reduction of delays.

These small start-up companies are very good at capturing this sort of niche business. As to how well they will identify other similar types of application, only time will tell. It will also be interesting to see how long they can stay in business providing a small number of such services as, no doubt, some will find it hard to break into new areas.

One cannot help but feel there must be something we can do with over 60 years of archived data on O.R. developments – it just needs someone to come along with the right imagination.

<OR>

THE ANSWER IS (EXACTLY) 42.00

IAN TAYLOR, FLYINGBINARY

Numbers have precision. Accuracy can be specified. Mathematicians would like to argue their discipline is the foundation of all science. So why on earth would you choose an (inexact) image to represent your (precise) numbers? How about this: Did you ever give an evidence-based presentation where your audience failed to understand your message? Or decision makers tuned you out or turned you out before you got to the point?

OTOH (On the other hand) Lies, damned lies and statistics. We all know that numbers must have context. If a subscription costs me £5, that might sound like good value. If add context of £5 per minute suddenly it's a different story. A big part of the problem we all face is the ability to present our context rapidly and effectively, in a manner that is accurately assimilated by our audience. Moreover, we need to snatch their attention, and then maintain that engagement while we elaborate the finer details.

It turns out - somewhat unsurprisingly when you think about it - that drawing pictures is the most intuitive way to communicate both the point and the context, rapidly and accurately. In fact, we've been drawing pictures for so long that visual understanding and analysis is now hard-wired into our biology. But we're not talking about stick-men on cave walls - there are specific rules about how to encode data with visual attributes to maximise the benefits of human visual evolution.

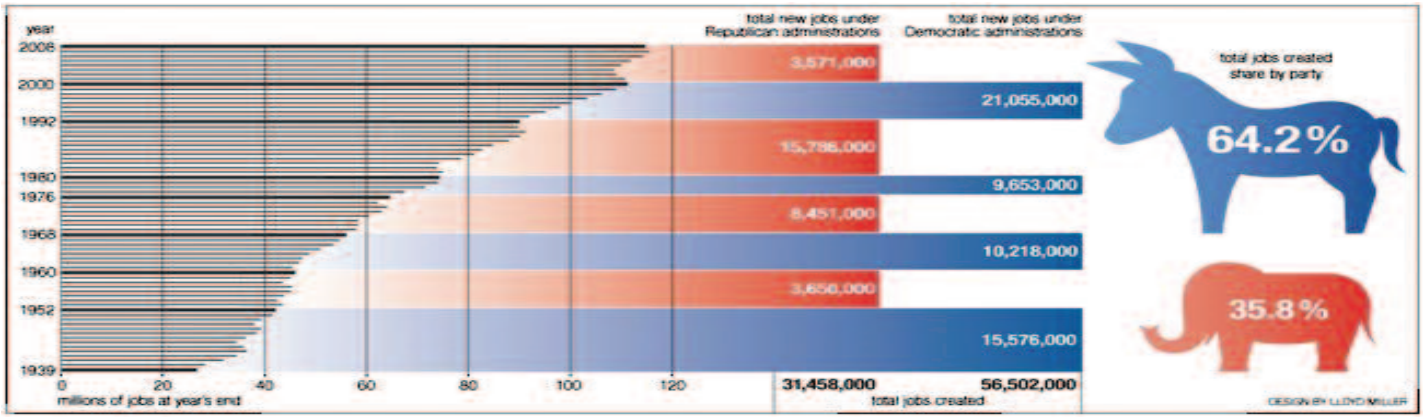
If you know some of these rules and take some care with the construction of the visuals, you can make a step change in your presentation impact, engage your audience and get your point across more effectively. We've put together a one-day Science of Data Visualisation course to take you from zero knowledge of visual analytics to a basic level of competence and give you the tools to continue your learning. The day is aimed at anyone who is confident manipulating and explaining numbers and wants to add core visual analytic capabilities. No doubt you've already created charts and graphs with varying degrees of success. Using a combination of presentation, interactive exercises and published examples we will examine the science and the rules of visual analytics and teach you why some visuals wow and some wilt.

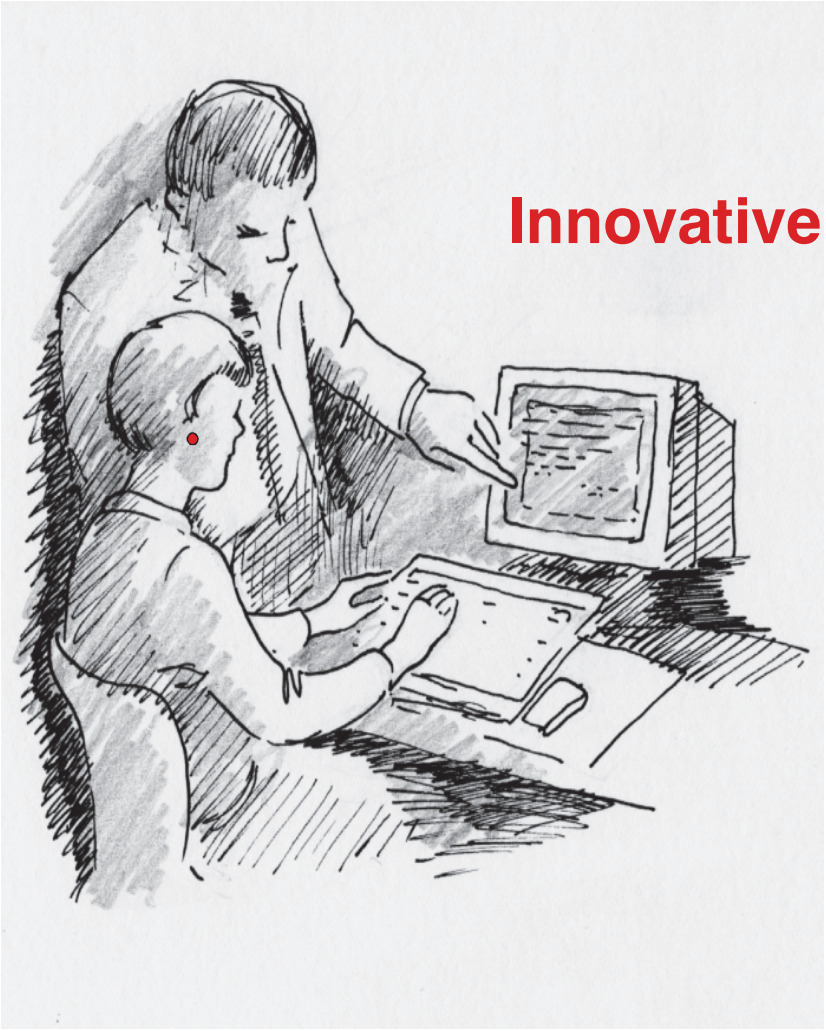
You don't need to bring anything to the course, and we will provide laptops so you can try the interactive examples in Excel. And if you're feeling particularly brave, why not bring some of your charts on a flashdrive for the group to critique? Speaking of which: if you've read this far you're probably wondering what I'm going to say about the chart below. Take a good look at it and see how many distinct observations you can make about its value as a visualisation. What is it trying to say? Does it succeed? Do you think it is accurate? Could another treatment give a more effective result? We will discuss all these questions and provide tools, tips and techniques to give you a great foundation in visualisation. The answer is exactly 42 - but what colour should it be?!

OR Society Approved Training Course: The Science of Data Visualisation
Date: Tuesday 4 March 2014
Location: Birmingham
Cost: £600+VAT for Members, £650+VAT for Non-Members

For further information, or to book, contact Jennie Phelps jennie.phelps@theorsociety.com or visit the website.

<OR>





Creative thinker?

Innovative individual?

Problem solver?

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

We offer a variety of well established, easy to use, decision support tools.
www.banxia.com

- **Decision Explorer®** - an ideas mapping tool used to organise and structure an individual's or a group's ideas about a problem or issue. This is a piece of software with many uses, in areas such as strategic management, risk assessment, project planning/ definition and general problem structuring. Single user licenses start from £99 + VAT.

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

- **Impact Explorer™** - a voting, ranking and matrix assessment tool. Groups use radio based handsets coupled with the Impact Explorer software to register their opinions or cast votes on the subject being discussed. The system supports up to 250 participants. Cost depends on the handsets being used. Prices start from as low as 31 GBP + VAT per handset. Handsets can be purchased in any quantity. Accompanying software license starts from £395 + VAT. System requires both hardware and software.

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

Banxia Software Ltd, PO Box 134,Kendal, LA9 4XF
Tel: +44 (0) 1539 815 660 Fax: +44 (0) 1539 815 661
Email: info@banxia.com Web: www.banxia.com

BANXIA® SOFTWARE
Visualize your knowledge™

FOUNDATIONS FOR THE FUTURE

GEOFF ROYSTON

'The Society has the good fortune to have in my successor, Stewart Robinson, someone with extensive experience not only of the workings of the Society – having been Vice-President – but also - having worked in consultancy and in universities - of both the practitioner and the academic faces of operational research.'

This being my last presidential article for *Inside O.R.*, it seemed appropriate to look back at my first such article, and to see what progress has been made in areas identified there as ones of opportunity or challenge.

That piece from January 2012 ('Learning from the past; preparing for the future') observed that *the Society is well-served and supported* by its board, its council, its various committees and by the staff in our office. Over the last two years I have seen that amply confirmed. As well as underpinning all the existing Society activities - in many of which, such as in the growth of our publications portfolio (and income), there have been considerable advances - these bodies have during the last few years also developed a number of new activities. Some of these focus on new opportunities for O.R. and for the Society – for example support for people identifying themselves as working in 'analytics', for O.R. in the third sector, and for pro-bono O.R., all of which now have an established place in the Society's repertoire. Others focus on key challenges, for example the establishment of a cross-cutting working group on retaining and growing Society membership.

On *'analytics',* I indicated in that first article that this was an area where the Society intended to get more active. With now two very successful annual one-day events and the launch of the Analytics Network and associated webpages under our belt I think we can say that we have been meeting that objective. This activity needs to continue to develop - there is clearly much valuable work still to do to build and sustain strong engagement with the 'analytics community'.

The need for wider engagement extends more generally. Back in January 2012 I noted the importance of *raising the business and wider public profile of O.R.* This has being supported by major improvements in the Society's websites and use of social media. More is on the way, not least an enhanced 'Science of Better' website which should assist O.R. to be more easily recognised, not, as sometimes it seems to be, as a rag-bag of mystifying techniques of applicability to a fairly narrow set of problems, but as a coherent, comprehensible and widely relevant discipline whose distinctive focus is *improvement* - a 'real world' science of improving the complex systems that underpin everybody's daily lives.

Some of the recent success stories in O.R. – for example the £13m LANCS initiative to build theory for practice in UK O.R. – should provide material that will form valuable grist to our profile-raising mill, as hopefully will some of the material on the impact of O.R. that will emerge from the 2014 Research Excellence Framework. Our image-building should be assisted also with trials of a planned magazine-style, client-friendly, successor to *O.R. Insight,* which could draw on such material.

Broader engagement could be assisted also through highlighting some facets of O.R. that currently appear less prominent than they might be. I mentioned in my earlier article that I thought that O.R. needed to add to its undoubted prowess in what I called the 'physics' of organisation a greater emphasis on and facility in dealing with the 'psychology' - taking stronger account of human thought and behaviour in our analytical and modelling work. Cognitive and behavioural factors can be crucial in O.R., both in the process of conducting analytical work, and in the content of a model of a situation involving human activity. OR Society efforts to foster this area have been progressing steadily with a successful workshop being held a few months ago and with plans now being firmed up for further development of support for *'Behavioural O.R.'* in 2014.

Efforts in another area I mentioned - highlighting the contribution of O.R. to the *design* of new processes and systems, to complement its better publicised contribution to *decision* making – are beginning to take shape, with members of the OR Society and the Design Society currently planning a joint workshop to share experiences, interests and ideas.

All of the above issues relate to at least one underlying theme; *investing in our future.* To emphasise the importance of this the Board decided that, to reinforce what the Society does to build foundations for the future through its usual activities, it should support some additional construction. So, back in February 2012, the Society announced its initiative on 'Investment projects to further the charitable aims of the OR Society', making available £100k for such work. Since then careful assessment of responses to two rounds of calls for proposals has led to funding of seven such investment projects, ranging from a project on the fitness for purpose of O.R. training for analytics to a project on the future role of O.R. in developing public policy. The results of all of the projects will be presented in future editions of *Inside O.R.*

Of course the future of the OR Society depends on its members, particularly its younger members. One particular pleasure of the last two years has been attending events, such as the Young O.R. conference, to see the work being done by those at the early stages of their career, and to hear how they wanted O.R. and the OR Society to develop. To provide greater profile and influence to this key segment of our membership there is now a 'Young to O.R.' section in *Inside O.R.* and the Society is setting up an Early Career Advisory Group (see December's *Inside O.R.*). I do hope people at the formative stage of their careers will take this opportunity to shape the Society's future direction.

The Society has the good fortune to have in my successor, Stewart Robinson, someone with extensive experience not only of the workings of the Society – having been Vice–President – but also - having worked in consultancy and in universities - of both the practitioner and the academic faces of operational research. I am sure all members will want to join me in wishing Stewart all the best for his presidency and to support him fully in taking our multifaceted – and now diamondiferous - Society onward.

<OR>

SEASONS GREETINGS

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

On behalf of the Staff and Officers of the Society, I'd like to wish all our members:

Merry Christmas & A Happy New Year

Please note that the office closes at noon on Tuesday 24th December 2013, and reopens at 8.30am on Thursday 2nd January 2014.

CAN DATA PROTECTION LAW HELP YOU GET THE MOST OUT OF BIG DATA?

SARA DEGLI ESPOSTI

The Big Data Protection Project, sponsored by the Open University, investigates tradeoffs emerging from organisations' need to harvest personal data, while respecting people's privacy.

Sara Degli Esposti. Photo: Andrés Lopez Trillo

As stated in the Treaty of Lisbon, all European citizens have the right to the protection of their personal data. This means that any entity, either public or private, processing personal data within the European Union, must comply with the EU 1995 *Data Protection Directive*. Each EU country has transposed its provisions through national laws. In the case of the UK, these provisions are contained in the 1998 *Privacy Act,* which is enforced by the Information Commissioner's Office (ICO).

The UK 1998 *Privacy Act* contains eight fundamental data protection principles. These principles, which derive from the EU 1995 *Data Protection Directive*, were already present in the 1980 OECD *Guidelines on the Protection of Privacy and Transborder Flows of Personal Data.* Similar ideas are also present in other national or federal guidelines and regulations, such as the US *Fair Information Practices Principles* (FIPPs), adopted by the Federal Trade Commission (FTC).

We can also expect the same principles, a little updated and extended, to become a central part of future legislation, as demonstrated by the proposed *General Data Protection Regulation*: the reform of the EU 1995 *Data Protection Directive,* meant to be approved by 2015.

What is interesting about data protection principles is that the way they are implemented not only influence customers' privacy perceptions and organisations' information security strategies, it also affects the quality, completeness, and format of the data collected.

As any analyst knows, data attributes strongly influence the reliability of the analyses that can be conducted, which means they influence what they can deliver. Especially nowadays, with the current emphasis on 'big data' analytics, having good, complete, easy accessible data can potentially make a big difference to organizations' performance and efficiency.

The mere existence of large amounts of digital data does not automatically generate business improvements. Data must be transformed into knowledge, and often knowledge must trigger some action, in order to produce any advancement. Analysts, such as operationals research practitioners, machine learning programmers or statisticians, who are the experts who create that knowledge, know very well the importance of applying good data management procedures and ensure high data quality.

Despite the importance of implementing good procedures for handling data, we know very little about the effects of data protection law on organisations' information management strategies. The academic literature speculates on its potential effects and offers only limited anecdotal evidence. Of course, some readers may have insights, and we would like to hear their opinions.

Several questions remain open. Is it still possible, in the era of big data, to comply with data protection principles? Are some principles more difficult to enact than others? And what tools and practices do organisations adopt to strike that balance between data protection and full data usage?

The Big Data Protection Project will study exactly the tradeoffs emerging from organisations' desires to exploit digital data and organisations' obligations to comply with data protection law. In more detail, the project will investigate the relationship between the implementation of data protection principles and the level of analytical sophistication an organisation has achieved. Do organisations, who rely on analytics as a source of competitive advantage, invest more or less in information security? By analysing the relationship between big data and data protection, the study will bring a fresh perspective on the issue of data protection and will help law makers understand better the reality of modern organisations.

A brief presentation of the eight data protection principles, which set the rules for lawful processing, will immediately give you an idea of the potential tradeoffs, paradoxes, but also opportunities these principles bring to modern digital organisations. As is usual with the law, the devil is in the detail. The basic hypothesis , interesting from an O.R. point of view, is that the implementation of these principles may influence, either positively or negatively, the chance of having good data, which affects the chance of applying analytics to extract useful insights.

Let' us start from the most problematic principles. Three out of eight principles set constraints on the amount of data an organisation can collect: they also prevent the reuse of data for unforeseen ends and require that data must be destroyed, once the purpose for which they have been collected has been achieved. In addition to that, organisations can only transfer data to countries with adequate data protection regulations, which limits data sharing opportunities.

Enacting these principles clearly means putting restrictions on data accumulation. This is something that may prevent organisations from having enough data to analyse. These principles are also clearly against the common practice of accumulating data without a clear purpose and in case of future use. A practice which has become quite popular thanks to low storage cost. But limiting data accumulation might also help organisations make sense of the data they have and use them better.

The safeguard of data integrity and confidentiality is also ensured by the respect of the eight data protection principles. Another principle requires all organisations to take the necessary security measures to protect data from abuse. No organisation wants to lose its data and face the reputational damages caused by a data breach.

Finally there are even data protection principles which may help organisations to maintain high quality data. One principle obliges organisations to keep data accurate and up to date, which are two things that certainly improve data quality. As any analyst knows, having good data is a fundamental precondition for accurate modelling and forecasting.

The respect of individuals' data protection rights can also contribute to obtain good data. For example, people must be given the chance to access their records and check whether the information is accurate. In the era of personalisation, privacy can become a business differentiator: by allowing your customers to revise their information, the organisation could not only build a better marketing relationship, but also ensure to have the latest updated information, which will help deliver only relevant ads and promotions.

Many variables play a role in determining an organisation's' information management strategies. The question now is 'what is the impact of data protection law?'.

If you want to have a say and contribute from the perspective of your organisation, just click the anonymous link below or cut and paste the following URL into your browser. We will highly value your opinion and you will have the chance to sign up and receive a report with the survey results.

https://openbusinessschool.qualtrics.com/SE/?SID=SV_0OJLgk18usJvWGV

To know more about the Big Data Protection project please visit www.bigdataprotection.co.uk or contact the project's principal investigator, Mrs Sara Degli Esposti, either by phone 01908 655697 or by email sara.degliesposti@open.ac.uk.

<OR>

NEWS OF MEMBERS

NEW MEMBERS (January 2014)

The Society welcomes the following new members,
EUAN BARLOW, Glasgow; KAREN CHAPMAN, Kent; KAREN FAIRALL, Surrey; STEPHEN MORAN, Cheshire; JACCO THIJSSEN, York;

and Reinstated members,
EMMA FROST, London;

and the following student members,
DIMITRIOS BYRITIS, Kent; DAVID CHU, London; PHILIP KALINDA, Hertfordshire; DANIELA MILITARU, Paisley; SARAH SHEEHY, Hertfordshire; BJORN VERDUIJN, Glasgow;

Total Membership
2317

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

Admit to the category of Candidate Associate (CandORS)
James SAYE
Alice ROBINS
Mahmoud OSMAN

<OR>

NEW YEAR'S RES-O.R.-LUTIONS

LOUISE MAYNARD-ATEM

Firstly I would like to say thank-you to Louise Orpin at the O.R. society for inviting me to speak at the Careers Open Day in Birmingham on 20 November.

I really enjoyed sharing my experiences with all of those who attended, and it was great to see so many people so passionate about a career in O.R. I also found it really fascinating to talk to the other speakers and exhibitors. Duncan Stewart from DSTL talked about how O.R. is being used in Defence and Michael Nicholson from IBM discussed the role of predictive analytics in online sports reporting and even though I have no interest in sport, I was actually tempted to watch a game of rugby afterwards.

An overarching take-home message for me is something I have said many times before, but really got to see it in action at the careers fair; the influence of O.R. really is everywhere – from your local Tesco to booking your next holiday with British Airways. The last slide from my talk in Birmingham posed the question of whether or not I felt I had made the right choice in moving from chemistry to O.R. and I came away from the day thinking an even more resounding yes!

New Year's Res-O.R.-lutions

January is always a time for people to set their personal goals for the year but sometimes professional goals can get neglected (unless aligned with a New-Year review process). Alongside my renewed commitment to actually use the gym membership I have been paying for, I would like to improve on my technical O.R. skills this year. Coming from a non-O.R. background, I am sometimes conscious of the fact that my in depth understanding of some O.R. techniques may not be at the same level as others in my position, and this is something I would like to change as it feel it would have both personal and professional benefits.

If you are anything like me, reading notes and textbooks is only effective up to a point. I find that I learn best by actually working through examples and attempting questions. This month, I would like to make good on my previous promise of putting specific techniques in the spotlight, giving worked examples and posing problems to be solved.

Problem Page

Technique - Linear Programming:

Linear programming (or linear optimisation) is a mathematical method for determining a way to achieve the most favourable outcome; companies want to maximise profits and minimise cost using limited resources therefore the technique is potentially very useful.

This type of programming consists of the following basic components:

- Decision variables – these represent the quantities we wish to determine.
- Objective function – this represents how the decision variables affect the cost or value to be optimised.
- Constraints – these represent how decision variables use the limited resources that are available.
- Data – quantifies the relationships represented in the objective function and the constraints.

In a linear program, the objective function and constraints are linear relationships, meaning that the effect of changing a decision variable is proportional to its magnitude. This provides a powerful analytical tool for supporting evidence-based decision-making.

Examples:

The following worked example relates to a more commercial scenario, where the use of linear programming/optimisation is prevalent:

1. Production Planning

   a. A company makes three products, in quantities x1, x2 and x3 per month.

   b. Profits per unit = 1.0, 1.4 and 1.6 respectively

   c. Each product uses different amounts of resources (labour and materials) as shown in the following table:

	Product 1	Product 2	Product 3
Labour	1/1000	1/800	1/500
Materials	1/1200	1/700	1/600

In order to maximise profits, what is the optimum production plan?

This problem can be solved as follows:

2. Maximise: $x_1 + 1.4x_2 + 1.6x_3$

Subject to: $(1/1000)x_1 + (1/800)x_2 + (1/500)x_3 \leq 1$

$(1/1200)x_1 + (1/700)x_2 + (1/600)x_3 \leq 1$

$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$

3. Solution*: $x_1 = 462$

$x_2 = 432$

$x_3 = 0$

*This solution was found using Microsoft Excel.

The **Simplex Method** is a popular algorithm used for solving linear programming problems and relies on the idea that the maximum value of the object function will occur at a 'corner' of a bounded feasible region. Equations rather than inequalities must be used in order to find the border of the feasible region and therefore slack variables are introduced. These are variables that are added in order to transform an inequality constraint into an equation.

Commercial uses of linear programming/optimisation range from menu planning to optimise meal production, creating portfolios in investment companies and crew and flight scheduling for airline companies; in light of this I think it is important that all of us at the start of our career in O.R. have at least a basic grasp of the technique.

Limitations:

It is important to consider the associated limitations and caveats when using any technique, and in terms of linear programming there are several to be mindful of:

- Since the technique optimises over a discrete period of time, it often only solves static problems, rather than dynamic ones. In the example above, the solution tells you what you to make during the month in question but does not take into account what you made in the previous month, or what you will need to make in the next month.
- Having solved this example in Excel, I noticed the sensitivity of the technique in that small changes to the inputs could produce very large changes in outputs, thus the solutions given are not particularly robust.
- In the example above you will notice that the solution does not involve making any of Product 3, although it gives the largest profit (though the solution shows this to be outranked by the considerably larger resource requirement); this poses several new questions including is it worth keeping Product 3 in production at all, by how much would you need to increase the profit margin in order to make this product viable and by how much do you need to cut resources again to make it viable? These questions are all particularly important from a commercial perspective, if you are looking to not only maximise profit but also to meet consumer demand.
- The primary limitation of this technique is that relationships involved have to be linear, and although it is possible to 'linearise' some functions, this does not detract from the fact that some real-world phenomena are poorly modelled by straight lines and non-linear relationships would be more appropriate.

Problem:

Now that I have discussed the basics of the technique, given an example of what it can be used for and highlighted the limitations, I thought I would end on a problem you can tackle yourselves, just to get those brains working after the festive break:

J&M Winery make two jug wines, House Red and Premium Red, and two higher-quality wines, Cabernet Sauvignon and Zinfandel, which it sells to restaurants, supermarkets and off-licenses. House Red is a blend of 20% pinot noir grapes, 30% zinfandel grapes and 50% gamay grapes. Premium Red is 60% cabernet sauvignon grapes and 20% pinot noir and gamay grapes. J&M's Cabernet Sauvignon is 100% cabernet sauvignon grapes and its Zinfandel is 85% zinfandel grapes and 15% gamay grapes. Profit of the House red is £0.90 per litre, profit on Premium red is £1.60 per litre, profit on Zinfandel is £2.25 per litre and profit on Cabernet Sauvignon is £3.00 per litre.

This season, J&M can obtain 30,000 pounds each of pinot noir, zinfandel and gamay grapes and 22,000 pounds of cabernet sauvignon grapes. It takes 2 pounds of grapes to make 1 litre of wine. If the company can sell all that it makes, how many litres of the various products should J&M prepare in order to maximise their profit?

I'm currently working on answering this question so I'd be interested to see how your answers compare with mine. I'm also interested in whether or not there are other techniques that may have been appropriate for solving problems of this nature, and your thoughts on the usefulness of the technique in general.

Answers on a postcard…or rather in an email to LMaynardAtem@live.co.uk and don't forget to put **Inside O.R. January Problem Solving** in the subject line.

<OR>

'… the influence of O.R. really is everywhere – from your local Tesco to booking your next holiday with British Airways.'

THE PRESIDENT'S MEDAL

NIGEL CUMMINGS

The Blackett Memorial Lecture is an annual event at which the opportunity is taken to present the OR Society's awards and medals. Although it was scheduled to be held at the home of the Royal Society, a particularly fitting venue as Lord Blackett was a onetime president of the RS, a last minute change had to be made owing to the large number of delegates. So, for the first time in its history, the 2013 Blackett Memorial Lecture was held in Browns Courtrooms, St Martins Lane, London.

Geoff Royston presents the winners medals

This year's President's Medal was awarded to Tony Lewins, Simon Mardle and Louise Fildes of Ernst & Young, for their work in optimising the retail network for New Zealand Post.

Tony and his team worked long and hard at optimising the retail network for New Zealand Post (NZP) and their efforts earned them one of our society's most prestigious awards.

NZP like the British postal service has undergone major transitions over the past few years in order to survive. The traditional business of handling letters has been in decline for years now but the handling of packages remains a healthy part of the business.

One factor considered in the work undertaken by the team from Ernst & Young was that of the increased urbanisation of New Zealand's population. There is for example, a trend for shops to move from the high streets outwards into out-of-town malls. This left NPZ in a less than optimal situation so it was essential to adapt rapidly if they were to stay in business.

The Ernst & Young team had several weeks of problem formulation and specifications to design and develop in collaboration with NZP analysts and regional managers. The work was split, time-wise between working in the UK and in New Zealand. A 'hot start' optimising algorithm was chosen because it gave significant speed improvements over pure simulated annealing. Around three months of calibration was required, particularly with regard to business flow.

The work has now been applied and has been in use on a weekly basis since February 2011 by NZP's network strategy team for a range of purposes which included: designing a national transformation strategy, planning, new outlet types, and exceptional event recovery. The work successfully identified how to evolve NZP's business into a radically new operation whilst, at the same time, improving annual performance by tens of millions of pounds.

This project was up against strong competitive entries from British Airways and The Ministry of Justice. The three presentations that vied for this year's Presidents Medal all provided compelling arguments for why they were worthy of gaining the award as well as providing a very enjoyable session at this year's (OR55) Conference.

Congratulations to Tony Lewins, Simon Mardle and Louise Fildes – President's Medal winners for 2013.

MICROMORTS AND MICROLIFES

JOHN CROCKER

Last year David MacKay talked about the need for using units (the kWh/day) to which everyone could easily relate in his Blackett Memorial Lecture.

David Spiegelhalter

At OR55, Michael Sanders gave a talk on 'behavioural insights' and how best to persuade people to do what you or more particularly, the government wants them to. So, in a way, David Spiegelhalter's 2013 Blackett Memorial Lecture provided a third talk in a similar vein.

Our understanding of risk is a very strange and largely irrational one but one which is used or more often abused in order to persuade us to do or buy things we would probably otherwise not even think about. Complementary medicine and diets are particularly prone to this as are the tabloid newspapers when it comes to reporting the dangers of certain actions.

David explained that there are essentially two categories of risk with which we are primarily concerned: acute and chronic. Acute risk essentially deals with accidental deaths – what is the chance of being killed if you do a parachute jump for charity, of being run over while crossing the road or being knocked off your bike. Chronic risk is more to do with life-expectancy – how many days/weeks/years will I knock off my life if I eat a sausage for breakfast every day? How many extra days will I have to keep going for a 20 min walk? How many repeats of 'Morse' will I miss if I watch an episode a day?

A useful unit of measurement for acute risks is the 'micromort' which is defined as a one-in-a-million chance of sudden death. A British soldier in the trenches on the first day of the Somme in WWI was at a risk of 45,000 micromorts. Flying on an RAF bombing mission during WWII carried something like a 25,000 micromort risk whereas getting out of bed and going to work carries only a 1 micromort risk. Doing a parchute jump, incidentally, carries around a 10 micromort risk. The Department of Transport values a micromort at £1.70 – safety campaigns or engineering work, for example, are carried out if they cost less than £1.70 per micromort reduction.

Although it is generally accepted that cigarette smoking is harmful, we are not so much interested in the likelihood of dying as a result of smoking one cigarette (unless, perhaps one was a soldier in the Somme) rather, we would like to know by how much we can expect our lives to be foreshortened if we smoke n cigarettes a day. One way of looking at this would be to work out how much more could we expect to spend if cigarettes were perfectly safe given we currently smoke 20 [harmful] cigarettes a day, say.

Just as the micromort is quite a useful measure for acute risk, the microlife (not to be confused with the microlite) is quite a useful measure for chronic risk. A microlife is roughly 30 minutes. It is claimed that watching 2 hours of television a day carries a risk of 1 microlife which equates to approximately 8 days year. By contrast, walking briskly for 20 min a day is thought to also be roughly equal to 1 microlife. As with all of these things, there is much debate as to whether taking a 20 min walk before watching a 2-hour episode of Morse cancels each other out – of course, a secondary factor might be whether the 20 min walk is to the pub or fish and chip shop.

If you were not one of the 150 delegates then you missed a very entertaining and informative talk. If you were there then please accept my apologies if the above bears no resemblance to the talk you heard.

View or download the video at:
www.theorsociety.com/pages/conferences/blackett2013mediapage.aspx

<OR>

'A useful unit of measurement for acute risks is the 'micromort' which is defined as a one-in-a-million chance of sudden death.'

STAFFORD BEER MEDAL

NIGEL CUMMINGS

This award is named in memory of Stafford Beer, a world leader in the development of systems ideas, especially management cybernetics, and President of the OR Society 1970-71.

Hope Koch and President Geoff Royston

The Stafford Beer Medal is awarded in recognition of the most outstanding contribution to the philosophy, theory or practice of Information Systems and / or Knowledge Management published in the European Journal of Information Systems (EJIS) or Knowledge Management Research & Practice (KMRP) within the relevant year.

As usual the award is given on the occasion of our annual Blackett Memorial Lecture. This year's award was given to the paper, 'Bridging the work/social divide: the emotional response to organizational social networking sites'. The paper was authored by Hope Koch, Ester Gonzalez and Dorothy Leidner and appeared in *EJIS* in 2012.

Organizations are split on their policies governing social networking sites (SNSs) in the workplace. Recent surveys indicate that while many organizations severely restrict or ban SNSs (i.e., Facebook and Twitter) at work, a large majority are actively using, or evaluating the use of SNSs. 'The paper investigates the implementation of an internal SNS designed to help a large financial institution's IT new hire program. On the basis of a case study informed by boundary theory and the theory of positive emotions, the research describes the SNS, its uses and how it impacted both the employees and the organization. We found that SNSs blur the boundary between work life and social life and that this boundary blurring creates positive emotions for the employees that use the system. These emotions create personal resources, which then have organizational impacts. While some of the non-users of the system, the IT middle managers, experienced isolation, frustration and resentment, the executives overseeing this SNS attribute improved morale, better employee engagement and even reduced employee turnover to the internal SNS.'

Hope Koch was there to accept the medal from President Geoff Royston on behalf of the team. Congratulations go to all three.

To read the full paper please access the following link:
http://www.palgrave-journals.com/ejis/journal/v21/n6/full/ejis201218a.html

Koch, H., E. Gonzalez and D. Leidner, (2012), Bridging the work/social divide: the emotional response to organizational social networking sites, *EJIS* **21**.6, Pp 699-717

<OR>

REGIONAL SOCIETIES

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

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

THE ELSIE CROPPER AWARD

NIGEL CUMMINGS

The Elsie Cropper award was instituted in memory of Elsie May Cropper, a senior member of the Operational Research Executive (ORE) of British Coal, who died in service in 1989, aged 44 years.

Gary Preece accepts his award from President Geoff Royston

Elsie had always been a strong supporter of sandwich students who worked for a year in industry as part of their degree. Although the fund set up in her name was initially to support grants for books for such students, the Society decided that it would be more appropriate to award the best paper presented at the Society's biennial Young [to] OR conferences. The award takes the form of a replica shield, with the winner's name being added to the Elsie Cropper Shield, held at the Society's offices.

We take pleasure in announcing that the 2013 recipient of this prize was Gary Preece. He received his award on the occasion of our annual Blackett memorial lecture, held in November 2013. This award is given for the best paper at the Young OR conference. As Geoff Royston, OR Society President said on this occasion: 'The Society is particularly keen to encourage younger members; after all they are our future!'

Gary's award was given for his presentation of his paper 'Improving communication in the police through viable system modelling' based on the work he did for the Government Operational Research Service (GORS).

The viable systems model (VSM) is an established modelling technique that enables the detailed analysis of organisational activity to examine how the structure and functions performed in an organisation contribute to its 'viability'.

VSM has been widely applied, in companies, industries and governments. However, whilst VSM concentrates on the structure and functions necessary for an organisation to be viable, it pays much less attention to information deployment within them. Thus VSM has been criticised for being unable to provide much help with detailed information and communication structures and new theories are called for to explore the way people interact and what information they need in the VSM.

The aim of this project was to increase understanding about the role that information plays in sustaining viability in organisational systems. The research built upon the domains of information management and systems thinking to extend our understanding of the VSM and to provide assistance on how organisations can manage their information to sustain viability. This has led to a number of contributions to knowledge and practice.

The sterling efforts of individuals such as Gary Preece have done much to show VSM can play a strong role in improving organisations' communications capabilities. Congratulations to a worthy winner of the Elsie Cropper award.

<OR>

TOCHER MEDAL

NIGEL CUMMINGS

This award is named in memory of K.D. Tocher, who made a significant contribution to the field of discrete-event simulation by developing the basis on which much modern software is built via his General Simulation Program. He was also the author of 'The Art of Simulation' (1963), a formative book in the field.

Csaba A. Boer

The Tocher Medal is awarded in recognition of the most outstanding contribution to the philosophy, theory or practice of simulation published in the *Journal of Simulation* within the relevant two year period.

This year the award was given to C A Boer and Y A Saanen for their paper, 'Improving container terminal efficiency through emulation'. The drive to increase productivity and profit and reduce costs is just as relevant to container terminals as to any other business. What makes it particularly difficult in their case is that most terminals have very little room for expansion, are strictly governed by the tides and it is generally too expensive to dredge the channels to a greater depth so are limited in the size of ships they can handle. To increase throughput, the terminal operating systems (TOS) need to be adapted to be able to turn ships around quicker through more efficient use of facilities, equipment and resources. 'A terminal operating system plays a major role in today's terminal operations, as it supports planning, scheduling and equipment control. Recently more and more tasks are performed by the TOS. These tasks need to be well-tuned to the operation (such as stowage planning, grounding decisions and equipment dispatching) in order to reduce cost and risk.'

The work that Boer and Saanen have done has included the use of 'an emulated virtual terminal' to help train operators and, at the same time, investigate alternative practices. This has led to significant improvements being made in fifteen terminals over the past three years.

Csaba Boer (pictured) was able to attend the award presentation and receive his medal from our President, Dr. Geoff Royston, on the occasion of our annual Blackett Memorial Lecture on 28th November 2013.

Boer, C.A. and Y. A. Saanen, (2012) 'Improving container terminal efficiency through emulation' *JOS* **6.**4 Pp 267-278

The links to access this are as follows:
http://www.ingentaconnect.com/content/pal/jos/2012/00000006/00000004/art00005?crawler=true

and

http://www.palgrave-journals.com/jos/jos_tocher_medal_winners.html

<OR>

THE OR SOCIETY DOCTORAL AWARD 2012

The OR Society makes a yearly award for the 'Most Distinguished Body of Research leading to the Award of a Doctorate in the field of O.R.' in memory of George Paterson. The PhD/DPhil has to have been defended during the qualifying period and the thesis been examined at a UK university.

Doctoral Award 2013. Kabir Rustogi accepts his award from Secretary and General Manager Gavin Blackett and President Geoff Royston

The winner of the award wins a cash prize of £1500. There could also be up to two runners up who would receive £500. In addition the successful candidates would be expected to present their work at the annual conference of the OR Society. The winner has their name engraved on the George Paterson shield as a permanent record of their achievement.

The criteria for the award are as follows:

- How conceptually robust the research is, in terms of all relevant theory from all relevant disciplines
- The level of originality in terms of the synthesis provided, and the new insights it has developed
- How relevant the work is in terms of potential implementation
- Why the methodology adopted during the research is better when compared to alternative approaches to the issues addressed
- The clarity of explanation with appropriate links to all relevant literature
- The extent to which it provides a platform for further related developments

The PhD Prize for 2012 has been awarded to Kabir Rustogi, University of Greenwich, for a thesis on 'Machine scheduling with changing processing times and rate modifying activities' which looked for examples of the effects of machines slowing down as more jobs were processed or as work speeded up as machine operators gained experience. However rate modifying activities like the maintenance of a machine or change of machine operator can affect the deterioration or the learning process so that interaction between all these varies.

OR Society President, Dr Geoff Royston, said of the work. 'That Kabir's thesis considered a variety of integrated models with both changing processing times and rate modifying activities present and so introduced a unified framework for tracking these, adding coherence to an area which previously was quite fragmentary. The external examiner commented on the work which resulted in six 'high quality journal' publications including an invited review. Kabir's work significantly changed the frontier in machine scheduling and changing job processes over time.'

Congratulations to Kabir Rustogi.

GOODEVE AWARD 2012

NIGEL CUMMINGS

The Goodeve Medal is awarded in recognition of the most outstanding contribution to the philosophy, theory or practice of O.R. published in the Journal of the OR Society (JORS) or OR Insight (ORI), within the relevant year.

Arne Strauss, Philipp Kemmer, Thomas Winter accepting their award from President Dr. Geoff Royston

The recipients of the 2012 Goodeve Medal are Arne Strauss,, Philipp Kemmer and Thomas Winter. Their paper, entitled 'Dynamic Simultaneous Fare Proration for Large-Scale Network Revenue Management' was published in JORS October 2012.

The award was made for Dr Strauss' paper on revenue optimisation that he co-authored with two practitioners from Lufthansa Systems Berlin, Germany. The paper 'Dynamic Simultaneous Fare Proration for Large-Scale Network Revenue Management'. 63, 1336-1350, Journal of the Operational Research Society, was published during 2012.

Regarding the paper, J. Goerke-von Stockert, Director Revenue Management & Pricing, Lufthansa Systems AG said. 'Besides the contribution to the theory of revenue management, the obtained results also represent a significant improvement of the practical approaches to large-scale revenue management...The improved computational performance results in reduced IT requirements and hence substantial potential cost savings of carriers'.

Airlines, train companies, hotel chains and other service providers share a common problem: how to maximise their revenue from each flight, train journey or night. The optimal solution for such problems can theoretically be obtained by a dynamic programme; however, it cannot be solved exactly due to the size of the state space even for small networks.

In practice, flight networks of major airlines can include over 1,000 flights and over 15,000 itineraries. The numbers are not dissimilar for train operators and hotel chains. In each case, prices can be adjusted up or down to in order to try to fill each seat/room at the highest price travellers are willing to pay at the time. If too many are sold, compensation will generally have to be paid to those 'bumped off' onto a later flight/train or moved to a different hotel. In the majority of cases, the service provider does not have a monopoly so prices also have to be adjusted in line with the competition.

Arne Strauss and his team proposed a new dynamic fare proration method specifically having large-scale applications in mind. Remarkably the proposals when adopted, resulted in an average run time reduction of 80% relative to the method previously employed. Their extensive numerical simulation study demonstrated that their method resulted in tightened upper bounds on the optimal expected revenue, and that the obtained policies were very effective with regard to achieved revenues and required runtime.

Professor Strauss, Philipp Kemmer, and Thomas Winter accepted their award from OR Society President, Dr. Geoff Royston, during the award giving ceremony which preceded the Blackett Memorial Lecture.

Kemmer, P., A.K. Strauss and T. Winter, (2012), Dynamic Simultaneous Fare Proration for Large-Scale Network Revenue Management, *JORS* **63.**10, Pp 1336-1350

BEALE MEDAL 2013

NIGEL CUMMINGS

This year's Beale medal was awarded to Professor Kevin Glazebrook, Distinguished Professor in the Department of Management Science, Lancaster University.

Kevin Glazebrook with OR Society President Geoff Royston

The Beale Medal is awarded annually and is made in recognition of a sustained contribution over many years to the theory, practice, or philosophy of Operational Research in the UK.

The citation for this year's Beale award states that, 'Kevin has made an outstanding contribution to Operational Research by the excellence of his research contributions and his influence on the support and development of the discipline in the UK.'

After obtaining his PhD in Mathematics from Cambridge University in 1976, Kevin Glazebrook worked for many years in the School of Mathematics and Statistics at Newcastle University. Then in 2002 he moved to Edinburgh as Professor of Management Science, and in 2005 he joined the Department of Management Science, Lancaster University.

Kevin Glazebrook's research interests concern how complex random systems should be optimally controlled. His work ranges from theoretical analyses of novel methodologies through to more applied work, with relevance to practical applications. Application areas include:

- The optimal management of networks of inventories (e.g., retail outlets);
- How manufacturing companies should manage the outsourcing of warranty repair work;
- How customers should be routed for service in complex service systems.
- Cargo revenue management
- The optimal processing of intelligence information
- The optimal deployment of resources for defensive surveillance

Kevin Glazebrook has been widely published in top academic journals in Europe and the USA. In 2011, he co-authored a book with John Gittins and Richard Weber on Multi-Armed Bandit Allocation Indices concerning the theory behind an important class of stochastic models.

In 2006 he was the founder and initial director of NATCOR, an EPSRC-funded national taught course centre in Operational Research. He directed NATCOR for its first six years, including securing follow-up funding from EPSRC in 2011.

He currently directs the LANCS Initiative, a £13M Science and Innovation project to expand research capability in foundational O.R. in the UK. This project is co-funded by EPSRC and Lancaster, Nottingham, Cardiff and Southampton universities.

He chairs STOR-i, an EPSRC-funded Centre for Doctoral Training in statistics and O.R. with substantial industrial engagement. The centre is joint between the Departments of Management Science and Mathematics and Statistics. It is one of only a few funded centres in the mathematical sciences in the UK.

He is a member of the EPSRC Peer Review College and currently serves EPSRC as a member of a working group, the 'People Pipeline Project' looking at career progression for early stage researchers. He has also advised on changes to the peer review system and served as Chair of several prioritisation panels.

He has been appointed by EPSRC to serve on the Mathematical Sciences Strategic Advisory Team until April 2015.

Kevin Glazebrook is also a member of sub-panel 10 for REF2014, which will be evaluating the quality of research in UK universities in mathematical sciences which includes Operational Research. He has served the OR Society by being a member of Council from 2007-2012 and currently serves on the editorial boards of the journals Mathematical Methods of Operations Research, Naval Research Logistics and Queuing Systems.

The Beale medal acknowledges that Professor Glazebrook has made an outstanding contribution to Operational Research by the excellence of his research contributions and his influence on the support and development of the discipline in the U.K.

BIG DATA AND CHIPS, TO GO!

NIGEL CUMMINGS

A major problem with big data is that it is getting even bigger and hence taking even longer to analyse which, up to now, has meant buying bigger, faster, more powerful computers but what if all that was to change?

Eldad Farkash

Eldad Farkash, CTO, SiSense has had the bright idea of treating data in a way similar to how the Internet splits up voice and data into packets and then reassembles it. If data from a relational database can be vectorised and then sliced up into 'packets', it might just be possible to analyse that data using the cache memory of a central processing unit

So having outlined what he wanted his company to achieve in analysing data, and doing it from the 'chip' level, Farkash took analytics software and made it work concurrently on multicore processors - like a parallel computer cluster on a chip. The technology would not have been possible a few years ago because so few chips were truly multicore, but now computers are often sold with dual, quad and octa core processors on-board – in effect parallel computers on a chip – ideally suited to slicing and processing data sets.

Whilst still under development SiSense has already demonstrated that multicore analytics processing is possible with Intel's Haswell architecture, which provides extremely powerful computing performance from chips that utilise up to 40 execution units per processor. With so much power available on single processors, Farkash believes that such analytics will soon be something you can hold in the palm of your hand. In two or three years SiSense analytics should, he thinks, be working on iPad and Android tablets.

SiSense represents a divergence from the high-performance computing Hadoop Hive Mind of big data. In the Hadoop hive world, you go to IT or your company's data scientist and book or beg for an hour of query time, then try to analyse as much data as possible in that time. If the facility to vectorise, slice and analyse data were always available to you from your own desktop or tablet, simply because you had processing units within them that were compatible with SiSense's integrated analytics approach, both the cost benefits and the speed at which analytics takes place could be vastly improved.

Currently SiSense works with large customers like Yahoo and Target, but it specialises in small to medium-sized businesses. Its flagship big data analytics product Prism can connect to any existing data source, process about 100 times more data than RAM based in-memory solutions, and be deployed immediately.

If SiSense succeeds in its goal of 'Building Big data analytics into what we do every day' and integrating analytics into the core functions of standard hardware, we could be close to the next evolutionary step in 'big data meets big business', ultra-fast data analysis in the palms of our hands!

Take a look at http://www.sisense.com/?src=header_logo for more information about SiSense and its current range of analytics products.

<OR>

'With so much power available on single processors, Farkash believes that such analytics will soon be something you can hold in the palm of your hand.'

RIOTS, JUSTICE LAB AND POLICY ANALYTICS

SUE MERCHANT

The latest Criminal Justice Special Interest Group meeting was held on 18 November.

The CJ SIG was treated to three very different but most interesting talks at our recent event in London. Speakers Toby Davies (UCL), James Riley & Georgina Eaton (MoJ) and Gilberto Montibeller (LSE) covered respectively the topics of a mathematical model of the London riots and their policing; the new Justice Lab; and recent work on Policy Analytics.

Ian Newsome, our chair, opened proceedings by welcoming all to the meeting, especially our speakers, and thanked Gilberto particularly for having conjured up a room for us at very short notice and for helping us get the technology to work.

Gilberto spoke first about the concept of policy analytics. He thought that there are many opportunities for O.R. in policy analytics but that O.R. needs to adapt to the new world, particularly by learning from Big Data to support policy making, embedding O.R. into organisational processes and paying more attention to the social aspects of how models are built up and employed. He went on to describe the work he and colleagues had done in helping DEFRA in the area of animal health by devising a systematic way of prioritising action when animal health risks are notified and limited evidence is available. This involved, for example, devising risk pathways for threats, using a decision analytic framework and working with the client to prepare a capability assessment. He also described some work for the National Audit Office in prioritising value for money studies which heavily involved the client in an MCDA approach.

Toby spoke next about the mathematical model he had built of the London riots and their policing, explaining that parts of the model were based on similar analyses like those used in retail modelling, the spread of infection and civil violence. Part of the research involved testing hypotheses about offender behaviour, such as whether standard criminological theories apply in riots (e.g. offenders offend close to home, the Thames acts a barrier to movement): it was found that theories do hold. The team attempted to model one day of riots in London, covering the build up to riots (not suppression), the decision to participate in rioting, choice of site and interaction with police. Once the model had been built it was used to test out the effect of different policies such as increasing police numbers. A toy had been built with Lego to help demonstrate the value of the tool to policy makers! The model was now being extended, for example to include five days, more sophisticated policy strategies, integration of the transport network, and communication between rioters using social networks.

Finally James and Georgina, who are statisticians in the Justice Data Lab team in MoJ, spoke about the role of MoJ and its new Justice Data Lab which was set up as a pilot in April after an intervention from New Philanthropy Capital which championed the scheme. They explained that the Lab helps third sector organisations, who work with offenders to try to prevent re-offending, to assess how effective their interventions have been by analysing relevant data accessible by the MoJ on their behalf. Organisations have to complete a pro forma with information about their clients and the intervention and send this to the Lab whose analysts extract the relevant offending information, clean the data, match offenders to the PNC, find a suitable control group, and then analyse the aggregate data for the organisation. They then provide a short report showing the outcomes and statistical significance to the organisation and after four weeks publish the results in an MoJ regular publication. Of the 30 reports produced so far, 11 showed a significant reduction in re-offending, 18 indicated insufficient evidence to draw conclusions, and one showed a statistically significant increase in re-offending.

The CJ SIG members present very much appreciated all the speakers giving so much of their time to talk about their work which offered something for everyone. OR Society members who were unable to attend will find the slides on the CJ SIG website soon: http://www.theorsociety.com/Pages/SpecialInterest/CriminalJustice.aspx

See website for details of next event.

<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.

Eleftherios Ioannou	Kent/Greece
Melissa Goodman	Cardiff
Elena Pershina	Edinburgh
Jennifer Bacon	Hants
Hawraa Mandan	Kent

<OR>

REGIONAL SOCIETIES

EAST MIDLANDS (EMORG)

CONTACT: Chris Smith

TEL: 01530 416426

EMAIL: chrissmith677@gmail.com

EMORG - Fuzzy Logic in Decision Support Applications

Date/Time: Tuesday, 21 January 2014 at 18.00

Venue: Room BE0.40 in the Business School, Loughborough University

Speaker: Prof. Robert John, Head of the Automated Scheduling, Optimisation and Planning (ASAP) Group, University of Nottingham

In this talk Bob will firstly give an overview of type-1 and type-2 fuzzy logic and the role of fuzzy logic in modelling uncertainty. The rest of the talk will cover some of the applications that he and others have worked on using fuzzy logic highlighting the advantages and disadvantages of the approach in real applications.

Speaker: Prof. Robert John, Head of the Automated Scheduling, Optimisation and Planning (ASAP) Group, University of Nottingham. Bob worked in industry for 10 years as a mathematician and knowledge engineer developing knowledge based systems for British Gas and the financial services industry. Bob spent 24 years at De Montfort University in various roles including Head of Department, Head of School and Deputy Dean. He led the Centre for Computational Intelligence research group from 2001 until 2012. Bob joined Nottingham this year where he leads on the LANCS initiative and Heads up the research group ASAP in the School of Computer Science.

EMORG - Annual General Meeting

Date/Time: Tuesday, 21 January 2014

Venue: Bar area at Burleigh Court, Loughborough University

Speaker: Chris Smith Secretary EMORG

The EMORG Annual General Meeting will follow the talk on 'Fuzzy Logic in Decision Support Applications' We will move from the Business School to the bar area at Burleigh Court at the University for the AGM where we can have a drink in more comfortable surroundings.

As well as electing a new committee, receiving the accounts etc, the majority of the meeting will be devoted to discussing the programme for next year. What events would you like to see? What are the new subject areas or visits that would attract you to meetings? Come along and share your ideas and suggestions (or if you can't make it, let me know your thoughts by e-mail chrissmith677@gmail.com)

LONDON & SOUTH EAST (LASE OR S)

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

LASEORS - Christmas Quiz
Date/Time: Thursday December 19th – 6.00pm (for 7pm start)
Venue: 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.

LASEORS popular annual quiz night is back please sign up early, for this year's festive event. All profits from the event will go to charity. Teams should comprise 3 - 6 people. As last year's winners will be able to tell you there will be lots of exciting prizes etc.

There is limited space, so entries will be accepted until capacity is reached. The entry fee is £40 per team this will include a buffet. Please send cheques payable to LASEORS, the team name, a contact phone number, email and name along with the expected number in your team, before 30th November to ensure a place. Post to Sandra Weddell, Transport for London, 5G6, 5th Flr Palestra, 197 Blackfriars Road, London, SE1H 8NJ

'O.R. – a virtual reality?'
Date/Time: Tuesday January 21st – 6:00 for 6.30pm

Venue: In the upstairs bar of Ye Olde Watling,
Speaker: Dr Geoff Royston, Immediate Past President, The Operational Research Society

Abstract: The talk 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.

MIDLAND (MORS)

CONTACT: Jen East (Secretary)

EMAIL: MidlandsORSociety@live.co.uk

PhD research showcase
Date/Time: Tuesday, 28 January 2014 at 18.00 – 19.30
Venue: Warwick Business School
Speakers: Mahdi Noorizadegan and Chenlan Wang
Non-members welcome, no charge is made. After the talk, you are welcome to join us and the speaker for a meal. For further information please contact MidlandsORSociety@live.co.uk

On vehicle routing problems with uncertain demands by Mahdi Noorizadegan, Warwick Business School

Abstract
In this seminar, we summarise popular modelling and solving techniques to deal with vehicle routing problems with uncertain

demands within a priory policy. Vehicle routing problem with uncertain demands is concerned with finding a set of routes which are valid and optimise an objective function. The definition of the valid routes and the type of objective functions play an important role in selecting modelling techniques within stochastic optimization and solution methods within integer programming. In this seminar, we briefly present two robust optimisation approaches and two stochastic programming techniques to model our problem. Then we apply a branch and cut method and a column generation method to solve the models. We assume that the customer demand will be revealed only on the vehicle arrival. Therefore there is a possibility that a vehicle fails to serve the customer at its first visit. Two common recourse actions are either returning to the depot for a replenishment and resume the pre-planned route afterwards or just leaving the rest of customers unserved in a cost known lost sale cost. Depending on the stochastic optimisation techniques we use, these recourse actions can be modelled within initial formulations and/or they can be calculated after solving problems. We compare the solutions of the models with/without recourse action using a set of performance measures. When the recourse actions are not modelled in the initial formulations we conduct a scenario based analysis along with simulation to investigate the optimal protection level in which the actual cost attains its minimum.

Inefficiency of selfish routing under stochastic demand by Chenlam Wang, Warwick Business School

Abstract
tba

Decision-support system for floods in Mexico by Oscar Rodriguez Espindola, Aston Business School

Abstract
Logistics is a field highly related to cost and profit, however its application in catastrophic situations has been driven by the need to protect people. With a rising awareness of the potential damages of disasters globally, research on emergency logistics is a very active stream of research in recent years and the role of operations research has been fundamental. Nevertheless, recent events are showing that authorities in developing countries such as Mexico are lacking of proper mechanisms for disaster preparedness and response.

The purpose of this research is to provide a decision-support system for flood preparedness and response based on the use of optimization and geographical information systems (GIS). The GIS includes specific characteristics of floods to assess the situation, whereas optimization is used to find the best location for emergency facilities, the allocation of pre-positioned stock and the distribution policy based on the results of the GIS.
The value of this research is to show the applicability of these components for developing an useful tool for flood management in Mexico, aiming to provide reliable solutions to improve disaster operations.

Modelling and measuring demand and performance in HMRC call centres
Date/Time: Wednesday, 26 February 2014 at 18.30
Venue: The Club Room, The Old Joint Stock, 4 Temple Row West, Birmingham, B2 5NY

Speakers: Steve O'Donnell, HMRC

Abstract
The management of call centre performance relies heavily on queuing theory work first carried out by Erlang in the early 20th century and much elaborated since. But this approach requires copious and detailed forecasting of future demand and resources and while it is excellent for short term performance management HMRC has found it less suitable for medium to long term performance planning of their call centres. Part of the problem, which any call centre under pressure faces, is it is difficult to establish how much demand the call centre has to handle. The work described here outlines a novel way of measuring the real demand faced by a call centre. This measure turns out to be intimately related to the performance of a call centre and allows the building of extremely accurate models of medium to long term call centre performance. HMRC adopted this model for managing call centre performance from April 2011 and, with the assistance of the improved understanding of demand and performance the model brings, went from handling 48% of calls in 2010-11 to handling 74% of call in 2011-12. This performance has been sustained in 2012-13 with performance in the later part of the year regularly achieving 90% + calls handled. The model was the primary tool supporting the recent decision to reprioritize £34m of HMRC funding into contact centre investment at a time of austerity in Government financing.

Optimising the Retail Network for New Zealand Post
Date/Time: Wednesday, 02 April 2014 at 18.30
Venue: TBA
Speakers: Tony Lewins, Ernst & Young

Abstract
New Zealand Post's (NZP) retail operation is in major transition. Like equivalent organisations around the world, its traditional business is declining and it is looking to offer new services and products to compensate. In particular, it has created KiwiBank, a retail bank offering home loans, current accounts and other banking services.

Further, the country's demographics are evolving away from rural areas to urban. Customer shopping habits are also changing as they increasingly abandon the High Street in favour of out-of-town malls.

This has resulted in the retail network becoming highly sub-optimal, both in terms of the existing business and for the future.

The project provided NZP with a model that optimises the retail network under any specified conditions. It also allows them to investigate scenarios for the future, including the introduction of new types of outlet, new products and future business volume assumptions. It accommodates operational, financial and social constraints.

A model future for the UK's nuclear legacy

Date/Time: Tuesday 13 May 2014 at 18.00-20.00

Venue: TBA

Speakers: Panos Frangos and Simon Hughes

Details to follow

Title to be confirmed

Date/Time: Tuesday, 17 June 2014 at 18.00-19.45

Venue: TBA

Speakers: Sayara Beg

Details to follow

Air traffic control, business regulation and CO2 emissions (tbc)

Date/Time: TBC

Venue: TBA

Speakers: Steve Hammond, NATS

Details to follow

The ooh – ahh of simulation

Date/Time: Tuesday, 21 October 2014 at 18.00-20.00

Venue: TBA

Speakers: Frances Sneddon, CTO Simul8

Details to follow

The use of O.R. in designing new supply chain network in Marks and Spencer (tbc)

Date/Time: Thursday, 27 November 2014 at 18.00-20.00

Venue: TBA

Speakers: Victoria Forman, Marks and Spencers

Details to follow

Please Note: ** Non-members welcome, no charge is made. After the talk, you are welcome to join us and the speaker for a meal. For further information please contact MidlandsORSociety@live.co.uk

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.

TEL: 029 2087 5524 Fax: 029 2087 4199

EMAIL: ThompsonJMI@cardiff.ac.uk

Dates for your Diary

- Wednesday 12th February – John Hopes, Ernst and Young.
- Tuesday 18th March – Rhodri Brown (Welsh Rugby Union) and Matthew Parry (Swansea University)
- Wednesday 7th May 2.00pm – Trip to Sony (Pencoed) for tour of Raspberry Pi production

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: James Crosbie

TEL: 07891244594

EMAIL: jamescrosbie@hotmail.co.uk

YHORG meeting : How do you solve a problem like Analytics? And **Theoretical and applied aspects of enhanced scheduling models**

Date/Time: Wednesday, 29 January 2014 at 17.00
Venue: West Yorkshire Playhouse, Leeds
Speakers: Stewart Robinson, Dr Natasha Shakhlevich
How do you Solve a Problem like Analytics?,
Stewart Robinson
Professor of Management Science, Loughborough University
President of the OR Society

Abstract: 'Analytics' seems to be everywhere, job adverts abound, companies talk of their analytics capabilities, and the press regularly report on activities in analytics. Meanwhile, in the O.R. world, our US counterpart, INFORMS, have thrown huge resources at analytics. So how should we, as UK based O.R. practitioners and academics, respond? In this talk I shall reflect upon my own analytics journey which started in around 2006. We shall ask what is analytics? Is it just another fad or something that will stay? And we shall finish by thinking about what this means for us. Come ready to discuss your own ideas on how we 'solve a problem like analytics.'

Theoretical and applied aspects of enhanced scheduling models, Dr Natasha Shakhlevich
Senior Lecturer, School of Computing, University of Leeds

Abstract: This talk will present several examples of scheduling models which incorporate non-classical features arising from applications: job patterns, simultaneous job processing, cost and energy factors. Considering examples from healthcare, modern distributed computing systems and transportation, we discuss the outcomes of theoretical research and their value for applications.

HUMOR COLUMN

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

For this month's contribution we thank Sarah Fores, my equivalent at EURO, the European Association of OR Societies.

A bloke starts his new job at the zoo and is given three tasks.

First is a general tidy-up of one of the bird enclosures. As he starts this, several finches swoop down and start pecking at his head and arms. He swots at them with his spade, killing three and frightening the rest away. Realising his employer won't be best pleased with this on his first day, he decides to dispose of the birds and hope that no-one notices. He's a little unsure what to do, but remembers that he's very near the lion enclosure. He scoops up the dead birds on his spade and slings them over the fence to the lions, figuring that they'd eat anything.

His second task is to clear out the Chimp house. The chimps, recognising the keeper is new to the job, start to pelt him with coconuts. Once again, without thinking, he lashes out with his spade. This time two of the chimps are killed. What can he do? Feed them to the lions, he says to himself, because lions eat anything...

He hurls the two corpses into the lion enclosure, just as before.

He moves on to his final job for the day which is to collect honey from the South American bees. As soon as he starts, he is attacked by the bees. He grabs his spade and smashes the bees to a pulp. By now he knows what to do and shovels them into the lions' cage because, as he's already learnt, lions eat anything.

Later that day a new lion arrives at the zoo. Wanting to fit in to his new environment, he wanders up to one of the other lions for a friendly chat and says, 'What's the food like here?'

The other lion replies, 'Absolutely brilliant, today we had finch and chimps with mushy bees.'

<OR>

MERRY CHRISTMAS FROM ALL AT THE O.R SOCIETY

The OR Society office staff enjoyed a delightful Christmas meal at Opus in Birmingham. The Christmas Co-ordinator Elves, Jennie and Louise, once again provided several party games and quizzes which were enjoyed (we think!) by all staff and the President of the OR Society, Geoff Royston, during the meal.

From Christmas Bingo to 'Say what you see catch phase Christmas special' and the Christmas general knowledge quiz, all staff were rewarded for their sterling efforts with fantastic prizes from the local pound shop! The winners of the quiz and 'Say what you see' were Team Christmas Nativity (Carol and Nav) and the winner of the Christmas Bingo was Gavin Blackett who was rendered speechless when presented with his Blow up Santa prize.

<OR>

Team Christmas Nativity, Carol Smith and Navin Moir (Competition Winners)

Staff deep in thought!

The Christmas Co-ordinator Elves supervising the meal from the far end of the table

OR-30

John Crocker

Although technically, I have not yet retired, by the time you read this I will have – in fact the way things are going I may even be retired by the time I have finished writing it!

As I have observed a number of times, life seems full of coincidences and this month is no exception – in fact one might be tempted to call it the Stafford Beer month. Nigel has written his about Stafford in his 'Great Men of O.R.' series, there is also an article about the winners of the Stafford Beer Medal and now I am going attempt to write about a paper that was published in *JORS* in January 1984 about 'The Viable System Model' written by, you've guessed it, none other than Stafford Beer.

I used the word 'attempt' advisedly as I have never found Stafford's papers either easy to read or to understand – not that they are not well-written, but that my level of education simply is not up to it. Given it took Stafford 30 years to develop the VSM, then I feel partially justified in not being able to fully understand it after just one reading.

As he says in his opening statement, '…the Viable System Model, […] sets out to explain *how systems are viable* – that is, capable of independent existence'. He notes that when we notice similarities between two different systems, for instance between the regulatory system of an individual and a group, or between a brain and a firm, we may use a simile or the more direct metaphor, neither of which should be taken too seriously. Equally, when we use this approach, we will often draw analogies which, as he says, 'may be carried too far'. The process 'begins to have the marks of a scientific method, when we try to develop rigorous formulations of the two conceptual models'. This he has illustrated using a V-shaped diagram showing 4 levels: the first linked by 'insight', the second by 'analogy', the third by 'isomorphism' leading to the fourth (at the bottom of the 'V') – 'scientific model'. To move down from level to level we start with 'perception', to 'homomorphism', to 'generalization'. This links, on the one side, 'management situation' to 'scientific situation' on the other. Apparently, one starts on one side with one system going down until one reaches the isomorph (bottom) testing the insights and invariances on the way then take another system and go up the other side repeating this like a yoyo.

It is at this point that my brain has started to hurt so I shall use one of my mathematics lecturer's favourite expressions, 'the proof is left as an exercise for the interested reader'. This was invariably followed by 'Please have it on my desk by first thing tomorrow morning' but I shall not be so unkind, however, if it has whetted your appetite then I recommend you visit the *JORS* archives and read the remaining 16 pages.

Beer, Stafford,(1984), The Viable System Model: Its Provenance, Development, Methodology and Pathology, *JORS* **35**.1, Pp 7-25 (jors19842a.pdf).

<OR>

OR-20

Are you getting enough dosh?

Results of first salary survey

Results of the OR Society's first salary survey show that the 'typical' person in O.R. can expect to start on around £15k, and to be earning £40k, including fringe benefits, by the age of 50, with remuneration rising fairly steadily by about £800 per annum throughout that period. There is some evidence of falling income beyond the age of 55. Inspection of the responses suggests that this is partly due to the presence of retired and semi-retired members in this age bracket.

These figures conceal wide variations, of course, depending on such factors as job description and location. Total remuneration (i.e., salary plus the cash value of fringe benefits, denoted by TRCE = Total Remuneration Cash Equivalent in the graphs) for O.R. managers, at £50k is almost twice the equivalent figure for O.R. analysts. In academe the gap is narrower, professors averaging £40k whilst lecturers pick up £27k on average. For all job descriptions, TRCE averages just over £40k in London, a little over £30k in the South East (outside London), the Midlands and Wales, and rather less than £30k in other regions.

Effect of promotion

The results clearly show up the financial benefits of promotion. A project manager (or, in academe, a lecturer) earns on average, about £7k more than an analyst (research assistant) of the same age, whilst an O.R. manager (or professor) can expect to pick up around £12k more than a project manager (lecturer) born in the same year.

The survey also reveals the value of qualifications. Respondents with an MSc earn, on average, £1.5k per annum more than those whose highest qualification is a first degree. A PhD is shown to be worth a further £2.5k per annum.

It pays to be self-employed

The results also show that it pays to be self-employed. On average employed respondents make just over £30k, whilst the partly self-employed (e.g. academics doing some consultancy) clear £40k and the fully self-employed respondents gross almost £60k, on average.

Practitioner-academic gap

The figures also reveal just how wide the gap between practitioner and academic salaries has become. Whilst a practitioner aged up to 25 can expect to earn £3.6k more than an academic of the same age, by the time they reach their late 40s or early 50s, practitioners are grossing, on average, £17.5k more than their academic counterparts.

Age Myth shattered

The survey questionnaires, which was mailed to a random sample of 24% of the non-student UK-based membership (around 600 members in all), attracted 261 replies, a response rate of 43%, or about 11% of the sampled group of members. The results reveal some interesting non-salary information, suggesting, for example that the myth that there are no O.R. people over the age of 30 is very much a myth. In fact, it seems there are surprisingly few young people in O.R. (presumably reflecting the fall in recruitment in recent years). The figures also show up the 'demographic time-bomb' in academe, where the age profile is heavily skewed towards the older end of the scale, with almost half the sample being aged between 46 and 55 (See Table 1).

TABLE 1 Percentages in various age ranges

	Up to 25	26-35	36-45	46-55	Over 55	Total
All	4%	34%	29%	29%	4%	100%
Practitioner	8%	46%	26%	16%	4%	100%
Academic	1%	24%	28%	44%	3%	100%

Only 4% self employed

Despite the recent trends towards the closure of O.R. groups and the growth of outsourcing and independent consultancy, 90% of respondents described themselves as 'employed' , and there were only 4% in each categories 'partly self-employed' and 'fully self-employed'. In terms of job description, the breakdown was broadly as one would expect from the distribution, of the Society's membership. Figures are shown in Table 2.

Table 2. Percentages by Job description

O.R. analyst / Consultant	24%
Or Project Manager	11%
O.R. Manager	8%
O.R. Research asst / fellow	1%
O.R. lecturer / SL	22%
Professor of O.R.	6%
Non-O.R.*	32%

*Of the 'Non-O.R.' category, 18% were managers or directors, 17% consultants, 15% non-O.R. academics; 7% were planners, 7% in IT and the rest in a variety of occupations, including one airline pilot and an organic farmer.

Where we work

Over a third of the respondents work in London and the South East, and over half in the other English regions. The geographical spread of the respondents is given in Table 3.

Table 3. Office locations

London	23%
South East excl London	14%
Other southern England	11%
Midlands	20%
Wales	2%
Northern England	22%
Scotland	7%
Non-UK	1%

The Society is most grateful to those members who completed the questionnaire. Apart from the survey's interest and value to members, it will be of considerable value in enabling us to provide accurate and up-to date information for the benefit of employer's, recruitment consultants, career advisors and careers guides.

<OR>

INSIDE O.R. Published by The OR Society, 12 Edward Street, Birmingham B1 2RX, UK. Tel +44 (0)121 233 9300; fax +44 (0)121 233 0321; email (Magazine items only) insideor@theorsociety.com (general) email@theorsociety.com. World Wide Web theorsociety.com. Inside O.R. is published monthly. A PDF of each issue is emailed to members registered to receive electronic copies in the same period as the printed copy is distributed. An electronic news bulletin with adverts and short news items is issued in the intervening period. Advertising sales enquiries and advertising copy: Jennie Phelps at the above address, or email jennie.phelps@theorsociety.com. Monthly print version mailed to members around the 25th of previous month. Copy deadline for print version: normally 10th of the previous month. Editor: John Crocker. Assistant: Jennie Phelps. Print version DTP and printing: Clarkeprint, Birmingham. Opinions expressed in Inside O.R. are those of the contributors alone and are not necessarily endorsed by The OR Society.

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

PROSPECT RECRUITMENT

Established in 1975

OR CONSULTANCY – HEALTH SECTOR
£40,000 - £60,000 Package

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

EXPERIENCED MANAGEMENT CONSULTANTS
Packages £65,000 - £100,000+

Our leading management consultancy client requires additional professionals, at both Principal and Managing consultant levels, to join their leading Strategy & Analytics group. Previous experience could include: optimisation, simulation, mathematical programming, customer insight, pricing strategy, yield management, business intelligence, data mining/modelling or forecasting; underpinned by a demonstrable track record of business development and proven people/project management experience. **Central London based**

SIMULATION CONSULTANCY
To c£35,000+Car Allowance+Bonus

Our client is widely acknowledged as a pioneering leader in business simulation and optimisation software/services. They currently have an enviable opening for a highly motivated graduate, either at MSc starter level or with 1-3 years experience to date, to join their successful and collegiate team. Previous experience of/an aptitude for dynamic simulation, advanced spreadsheet modelling, database systems and optimisation would be highly beneficial. **West Midlands**

MI/PRICING ANALYSTS
£35,000+ Plus Benefits

Driven by an increased focus on auditing risk, our large well-respected Financial Services client is looking to recruit a talented Analyst to automate existing reporting to a high standard, test and analyse the statistical SAS pricing models and focus upon the provision of robust MI/BI. The successful individual will possess a strong academic track record, solid SAS reporting skills and excellent stakeholder facing capability. **Manchester**

ON-LINE OR ANALYTICS
£47,000 - £55,000 + Benefits

An enviable opportunity to join one of the world's largest online brands. This role has been created to address the provision of highly skilled analytics to their specialist global Search function. Our client requires an accomplished OR professional with at least a strong numerate degree, 2-3 years' intimate knowledge of Excel and SQL and the ability to work in fast paced environment leading insight analytics and algorithmic development. **Surrey**

STATISTICAL MODELLING
£40,000 – £70,000+

Exciting opportunities available with a strong UK Financial Services brand. Working with the very latest SAS version software, in which they have invested heavily, you will be modelling real time customer pricing analytics. With investment in people being of equal importance, they seek high calibre individuals, across a range of SAS ability levels, who can also offer impressive academic achievement coupled with drive, enthusiasm and good team skills. **North West**

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

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

SENIOR RISK ANALYST – SAS
£30,000 - £55,000 + Benefits

Our client prides themselves on their ability to identify and develop innovative debt management solutions for their clients, the Risk Analysis Team is integral to formulate these solutions. The successful candidate will have proven working experience in either a Risk or Marketing environment. Financial Services and Debt experience an advantage but not essential. Given the team's use of SAS, working knowledge is essential including manipulating and analysing large data sets with customer information. **Surrey**

BUSINESS CONSULTANT–SIMULATION
To c£35,000 Negotiable DOE

Are you looking to make a difference in a varied and diverse project management role? With your consulting projects you will have the opportunity to save lives in Healthcare, deliver significant ROI in Manufacturing, and contribute to advances in Aerospace. So, if you have strong analytical skills, project management experience, a passion for process improvement, and a desire for some international travel (c25% of your time in EU & US) this could be the role for you. **Glasgow**

INSIGHT MANAGER
£45,000 - £55,000 Negotiable DOE

Our client's vision is to become every customer's favourite way to shop, whether they are in store, online, at home or on the move, anywhere in the world. This role sits within the team which first and foremost represents the customer with regards to price. You will be responsible for running the operation of producing and delivering their weekly pricing information; this role has lots of opportunity to influence the business in terms of their pricing policy. **Hertfordshire (25 mins from London Kings Cross & Liverpool Street)**

FINANCIAL MODELLING CONSULTANTS
£Excellent + Benefits

Experienced Financial Modellers sought on behalf of this respected professional services firm who have aggressive growth plans as a direct result of increased client demand. There is an urgent need to recruit additional professionals at Consultant/Senior Consultant level with a good numerate degree, strong Excel modelling skills, an affinity for the consultancy environment, who are ambitious, effective self-starters with a goal orientated approach. **London & Bristol**

ANALYSIS MANAGER
c£50,000 + Benefits

Experienced analyst sought to lead a small analytical team. The main focus of the role is the mentoring an internal analysis team and project management. However the role will also involve liaising directly with end clients so in addition to strong technical skills (SAS, SQL, Excel all essential pre-requisites) and advanced analysis and modelling skills related to clustering and predictive modelling, the successful candidate should be articulate and confident - ideally with a retail or subscriptions background. **London**

SENIOR ANALYST
c£44,000 - c£51,000 + Benefits

This newly created team seeks to resource experienced Senior Analysts to develop a hub of advanced modelling and analytical expertise that can be used to run complex analysis and provide recommendations for key business decisions. The successful candidates should have significant experience of using advanced modelling techniques and recent experience of using statistical tools such as SAS, SPSS or R in addition to experience of using various tools to analyse large and complex data sets including Excel and Access. **Warwick**

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

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