

INSIDE O.R.

JANUARY 2013 NO 505



**'WITHOUT MATHS, WE CAN'T
COUNT ON OUR JOBS'**

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

MATHEMATICAL MODEL MAY REDUCE INFECTIONS FOLLOWING CHEMOTHERAPY

OPEN ACCESS - YOUR QUESTIONS ANSWERED

WHAT'S NEXT FOR ANALYTICS?

O.R. AT BRITISH AIRWAYS: A LITTLE PRE-HISTORY



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EDITORIAL

JOHN CROCKER

For those who searched, in vain, for the article on Tizard, I can only proffer my apologies; alas space was short so it was decided to hold this over for a month but hopefully you will find it somewhere in this issue.

Not wishing to get into a debate over who should be given the credit for founding operational research, you may find OR –30 of some interest in this respect.

Richard, in his last 'Leader' as Past President, uses a recent report produced by EPSRC as his theme. This draws particular attention to the contribution that mathematical sciences research makes to the UK economy. By the time you read this, you will probably have heard and had chance to forget what George Osborne has decided to do to create some growth.

Open Access continues to be a major subject for debate – this month we hear what Palgrave has to say about it and what they are doing with the OR Society journals. Another issue that is unlikely to go away for a very long time – probably a lot longer than the debate on OA is climate change and sustainable energy. This year's Blakett Memorial Lecture was given by David MacKay on this subject – if you were not there then the article on this may give you a flavour of what it was all about; if you were there then I can only apologise if it was not how you remembered it.

The same comment might also be appropriate with respect to the article on Stewart Robinson's Inaugural Lecture. Alas, the author was not able to attend so has had to rely on hearsay evidence so is almost certainly a more accurate account of the proceedings than would have been the case had he been present.

The visit of the CJ (Criminal Justice) SIG to the Ministry of Justice appears to have produced four interesting papers across a broad area. There is also a number of articles with an analytics theme. We even have a not so shaggy dog story from Lake Michigan.

I am now off to a conference on Mirce Mechanics in Exeter before flying out to Berlin to report on the first WinterSim Conference to be held outside of the USA.

Wishing you all a very Happy New Year from all the team at Inside O.R.!

<OR>

LEARN ABOUT O.R. – NEW VIDEO

LOUISE ORPIN, EDUCATION OFFICER

The long awaited refreshed Learn About O.R. video is now available.



It is with great thanks to Asda, British Airways, GORS and Tata Steel that we are able to promote an updated version of the hugely successful Learn About O.R. video. The new case studies feature:

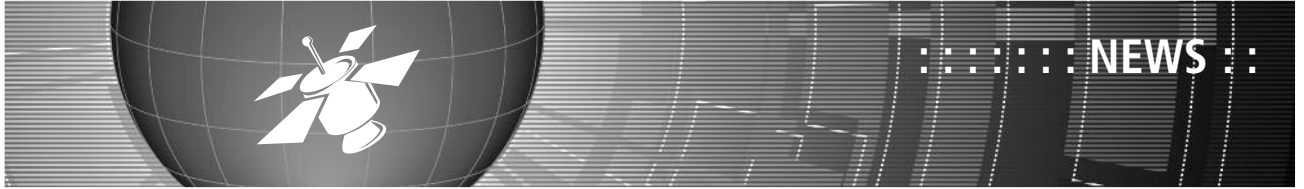
- Asda Distribution and how they use O.R. to improve the supply chain process from which type of delivery vehicle to use to where to locate a new depot;
- the British Airways O.R. Team and how they helped the business reduce the risks associated with introducing the new Airbus A380 to their fleet;
- GORS and its work across all government departments to help with many problems such as the deployment of the various emergency services, modelling the number of people entering and leaving the country and working to reduce crime; and

- Tata Steel using O.R. to improve productivity and reduce costs by identifying the impact on the infrastructure of increasing steel production by 20%.

The new video can be viewed on the LearnAboutOR website and on YouTube on the LearnAboutOR channel,

www.youtube.com/user/LearnAboutOR. The case studies are available to view individually as well as the full film. Please help to promote the new video by sharing links via social media or embedding the videos in relevant websites that you might have. You can also request a free copy of the DVD to give to a local school or college.

<OR>



BEALE MEDAL FOR MARK ELDER

NIGEL CUMMINGS

The OR Society's Beale Medal is awarded in memory of the late Martin Beale. It gives 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. For 2012, the medal was awarded to Mark Elder, Simul8 Corporation.



Mark Elder and Geoff Royston

Mark has been a pioneer in the field of visual interactive modelling for many years. He gained a degree in O.R. at the University of Lancaster, and he obtained his doctorate for research in the field of simulation from the University of Strathclyde where he spent some time working as an academic. He started his career in simulation work in the automobile industry. In the late 1970s he was one of the team who created the SEE WHY tool, programmed in Fortran 77 and launched to an appreciative simulation community in 1980. *(SEE WHY was the world's first commercially available visual interactive simulation package.)*

Then Mark went on to play a significant part in the creation of the simulation company Insight Logistics in which he helped develop genetic software simulation applications. In 1994, Mark founded SIMUL8 Corporation and currently serves as the Chairman of the software development company. Along with his expert knowledge of SIMUL8 applications, his pedagogical experience also includes teaching simulation within the Department of Management Science at the University of Strathclyde

Simul8 software has had a major impact on the field of simulation. For the first time it provided really affordable simulation software which has been widely used in industry and the public sector, in the

UK and overseas. Through Simul8 educational licenses and support for academics, simulation has been introduced to thousands of undergraduate and post graduate students across the world.

Mark has been an influential speaker at many events in the UK and overseas, and a familiar face at O.R. conferences; he was a plenary speaker at our national conference in 2007. More recently he was one of the invited speakers at the Society's first national event for developments in advanced analytics. He has also served the O.R. Society by being a member of council and member of the society's accreditation panel.

To summarise, Mark Elder has made a rich a varied contribution to O.R. He has, throughout his career in O.R., enabled a 'step change' in the use of O.R. methods, particularly in simulation. Perhaps this owes much to the fact that Mark's work has been driven by his vision that anybody working in any process should be thinking about how to improve it by 'simulating' their own ideas for change. Throughout his research, teaching and the software companies he has founded, Mark Elder has taken us a long way toward achieving that vision.

<OR>

'Along with his expert knowledge of SIMUL8 applications, his pedagogical experience also includes teaching simulation within the Department of Management Science at the University of Strathclyde'

MATHEMATICAL MODEL MAY REDUCE INFECTIONS FOLLOWING CHEMOTHERAPY

NIGEL CUMMINGS

A new mathematical model suggests that a proper risk assessment of infection with cancer chemotherapy needs to evaluate both the quantity and quality of white blood cells.

The model built by Weizmann Institute mathematicians in collaboration with physicians from the Meir Medical Centre in Kfar Saba and from the Hoffman-La Roche research centre in Basel, Switzerland, has revealed previously unknown mechanisms responsible for the variability in the vulnerability of neutropenia patients to infections.

Though chemotherapy for cancer can save lives, it can also have severe side effects, including the destruction of a patient's immune system and hence increase risk of infection. Currently, the major criterion to assess this risk is the blood cell count, where the risk of infection is considered high if the number of white blood cells falls below a critical threshold.

Neutropenia occurs when levels of white blood cells, mainly neutrophils, are dangerously low. This condition often emerges after chemotherapy or bone marrow transplant. Severe infections can develop if the immune system does not perform its crucial function of devouring and destroying bacteria.

The new model finds that variability in the effectiveness of neutrophils between healthy people usually has no significant consequences. However, for patients with neutropenia, the individual variability can make the difference between life and death. The study has drawn this conclusion based on analysing blood from four healthy volunteers. The analysis needs to be applied to large populations for the model to be used in the clinic.

The model explains why acute infections develop in certain patients after chemotherapy or a bone marrow transplant, even if their neutrophil levels have returned to relatively normal levels. Chemotherapy lowers both neutrophil levels and function, so the tissues of these patients are more penetrable to bacteria. The model suggests that this results in a rapid increase in bacterial concentrations that gives a head start to the bacteria and then the neutrophil recovery is insufficient to overcome the infection.

The model also suggests that in neutropenia, the tug of war between the blood cells and the bacteria cannot be explained away by the simple bacteria-to-cell ratio or by the threshold that the blood cell count must exceed. Rather, when neutrophil counts are low, the patient's immune system enters a fragile equilibrium – described as 'bistability' in mathematical terms – which can easily be disrupted, with dramatic consequences, by even minute changes in bacterial concentration or neutrophil numbers. Other factors that



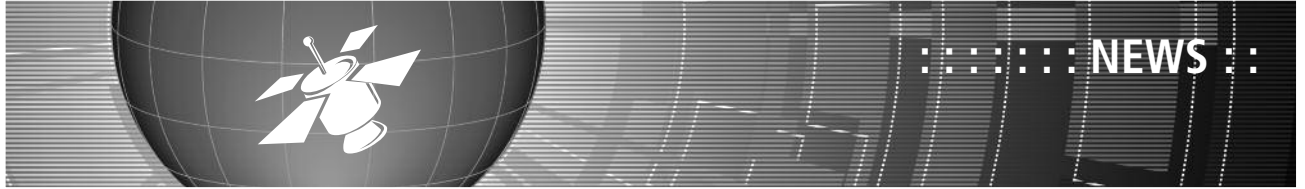
can radically affect this equilibrium include the effectiveness of the neutrophil functioning and the permeability of tissues to bacteria, which can increase due to cancer therapy.

The model has already offered a plausible explanation for a number of medical mysteries. It helps explain, for example, why after chemotherapy, some cancer patients contract life-threatening infections even when in isolation under sterile conditions. If the neutrophils of these patients are 'weak,' even the smallest numbers of bacteria can tilt the fragile immune balance in favour of the bacteria.

A study associated with the new model suggests that to achieve optimal results in applying chemotherapy, and/or in patients with innate neutrophil dysfunction, it is of value to assess the patient's neutrophils periodically, as well as the bacterial concentration. Such assessments will help reduce the morbidity and the mortality, as well as the cost, associated with unnecessary hospitalisations and the administration of expensive medications.

The study also explains why certain patients, following chemotherapy or a bone marrow transplant, may develop acute infections even if their neutrophil levels have returned to relatively normal levels. The chemotherapy lowers both neutrophil levels and function, making the tissues of these patients more penetrable to bacteria.

Moreover, by cutting down on the use of antibiotics, these assessments can help in preventing the rise in antibiotic resistance.



BAD NEWS: people who left it too late to book the November 2012 Using Soft Systems Methodology training course missed out.

GOOD NEWS: A RE-RUN HAS BEEN ADDED on **FRIDAY, 8 FEBRUARY 2013**

BUT: all those who missed out last time have already booked and remaining spaces are very limited. Prompt booking for this additional course is highly recommended.



The November 2012 sell-out

- The practical skills of applying SSM
- Using SSM for thinking about and planning projects
- The importance of process and process facilitation
- Using SSM models to improve dialogue and decision making
- Direct application of SSM in the delegate's workplace

Course Provider: Mark Westcombe (Attivation)
8 February, Birmingham
£540 + VAT Members; £590 + VAT Non members
A Hands-on course

To book this course online,
go to www.theorsociety.com
or call Jennie Phelps on 0121 234 7818.

But we suggest you do it now to avoid disappointment!

COURSE DETAILS

This is a practical course aimed at developing expertise in applying Soft Systems Methodology (SSM). We look at the application of SSM for problem structuring within complex projects, and how to use the approach for planning the project process.

<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.

David Crawford

London

<OR>

Announcement and Call for Papers

THE FIFTH EUROPEAN CONFERENCE ON INTELLIGENT MANAGEMENT SYSTEMS IN OPERATIONS

3-4 JULY 2013, UNIVERSITY OF SALFORD, U.K.

ORGANISED BY THE U.K. OPERATIONAL RESEARCH SOCIETY



Call for Papers - Deadline for Extended Abstract Submission **21 December 2012**.

Operations management poses a number of problems of significant complexity whose solution would lead to more effective operations and bring significant economic benefits. Their solution, however, require novel approaches that are based on techniques and principles from both Operational Research and Artificial Intelligence.

As business and industry become more global, diverse and market driven, the drive for more effective solutions for problems in operations management increases. Using traditional O.R. techniques alone has long been recognised as being too restricted for many applications, leading to research on the use of a combination of AI and O.R. techniques for problems in operations management.

This will be the fifth in a series of conferences that aims to bring together researchers developing and applying techniques from AI and O.R. to problems in operations management. Previous conferences held in 1997, 2001, 2005 and 2009 proved to be very successful and led to a total of six special issues of the Journal of the Operational Research Society and the International journal of Manufacturing Technology Management.

This conference, to be held in Media City, Salford University, aims to bring together researchers and practitioners working on the challenging problems in operations management that are at the O.R.-AI interface.

Researchers and practitioners from industry and academia are

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

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

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

Key Dates & Deadlines

- * Indication of intention to present a paper A.S.A.P.
- * Extended abstract of around 500 words to be submitted by 21 December 2012.
- * Accepted papers to be notified by 19 Jan 2013.
- * Full papers to be submitted by 29 March 2013.

Organising committee

Khairy A. H. Kobbacy, University of Salford (Chair)
Sunil Vadera, University of Salford (Co-Chair)
Hilary Wilkes, Conference Organiser, The OR Society

Submission Procedure

Send intent to attend/submit a paper or abstract to:
Khairy Kobbacy or Sunil Vadera,
The University of Salford,
Salford, M5 4WT UK.

EEmail: k.a.h.kobbacy@salford.ac.uk; s.vadera@salford.ac.uk

STEWART'S INAUGURAL LECTURE

JOHN CROCKER

On Wednesday 14th November 2012, Stewart Robinson gave his inaugural lecture to a crowded auditorium, as Professor of Management Science at Loughborough University.

Stewart's main interest is simulation modelling and its practice. He has recently co-authored and edited a book on Conceptual Modelling ('Conceptual Modeling for Discrete-Event Simulation' by Stewart Robinson, Roger Brooks, Kathy Kotiadis and Durk-Jouke Van Der Zee).

The evening started with light refreshments during which the audience had an opportunity to chat with Stewart. The main theme of Stewart's talk was that models 'should be as simple as possible, but no simpler' to quote Albert Einstein. In achieving this aim, it is important to understand what the purpose of the model is. If the model is to enable the sponsor to gain a better understanding of the problem then this will generally require less complexity than if the primary purpose is to forecast the future.

Stewart drew extensively on his experiences and used a number of examples, including some from the health services, knowing that most of his audience would be particularly familiar with such scenarios having probably been on the receiving end of them. His first example was the designing of a new out-patients' building. Most might be tempted to look at this problem in great detail by modelling a whole week with possibly different arrival rates for every hour of every day for each specialism including data on the probabilities of 'no-shows' ('DNA'), late arrivals, multiple tests and consultations. There is also the possibility of getting involved in the numbers of rooms with specialist equipment, the working hours of the specialists and other trained staff and, of course, a detailed knowledge of how long each consultation is likely to last for each specialism etc.

A quick look through the schedules showed that the busiest time was Monday morning at 9am. By using the minimum of data, Stewart was able to produce a set of graphs which showed the probability that the clinic would finish by a certain time against the number of rooms incorporated into the design. This showed that the earliest the last patient would leave ranged from just under 2 hours (11am) to almost 4 hours (1 pm) depending on whether there were 60 down to 40 rooms. This set the lower bound on the rooms required. The point being that a model need only to be complex enough to fit some intended purpose; thus being clear about that purpose is the key.

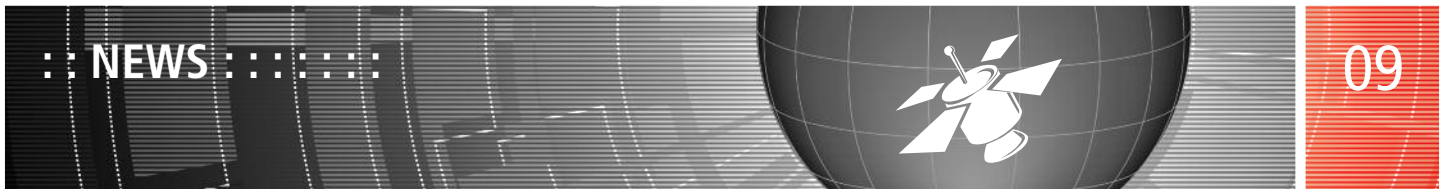
'a model need only to be complex enough to fit some intended purpose; thus being clear about that purpose is the key'

Stewart then looked at an Ophthalmology Clinic. Patients had to wait a long time, doctors arrived late and the nurses and admin staff were overworked. The overall result was that of low morale. He used what he referred to as facilitated modelling with a simple model. The first task was to create a process map showing all the possible interactions and stages. From this was developed a relatively simple visual simulation model of the process in a matter of hours.

The outcome, 'The simulation was the turning point in the discussion; we talked a lot more about the model than about the map on day 1.' The impact was a 15% reduction in waiting time. The point being that the dynamic representation of simple, visual simulations can help shift a discussion from an abstract to a concrete level.

From this Stewart took up the theme of models acting as decision aids rather than decision makers. He laid down five key principles:

- 1) The world is complex – model simple (but not always)
- 2) Focus on the decision not the system
- 3) Abstract – don't model all you know about the world
- 4) Interpret the results in the light of wider understanding (simple models are for thinking not predicting)
- 5) Involve the decision-maker (learning from modelling).



(To this, I would like to add an observation; it is generally a lot easier to add complexity than it is to remove it.)

Stewart ended his lecture by setting the audience some homework. This constituted two weather forecast maps with quite different representations of the forecast, mostly because they came from quite different eras. His question was: which is the best model? Stewart reminded the audience to think about the decision they were going to take and so their need for a weather forecast.

I don't know how many other universities have this tradition of Inaugural Lectures, but it certainly seemed like a good way for everyone to get to know each other and find out a little of what new professorial staff do.



(To see the lecture in full, please visit

<http://www.lboro.ac.uk/service/publicity/inaugural/past-lectures-video.html>)

<OR>

SPONSORS AND EXHIBITORS

For three major conferences in 2013: The OR Society would welcome your generosity and support.

Raise your profile with O.R. professionals

The OR Society will be running three conferences – in April, June and September 2013, which we hope some of you would like to sponsor and/or take exhibition space.

The Society seeks sponsorship for a number of elements of its conferences, with the income received helping to keep registration fees as low as possible. Potential sponsorships include printing of conference handbook, keynote/tutorial papers book, conference gift, individual streams, website publicity and more.

Our conferences are a great place to meet O.R. academics and practitioners alike. Promote your services, speak directly with people and find out what they really need. A great opportunity to make yourself better known as a consultancy in the field, or offer software or other products to help O.R. analysts solve their problems.

Whether you exhibit or sponsor, your details will appear on our website, in general conference information and in *Inside O.R.*, the Society's monthly magazine.

Please take a look at the individual Society conference websites below for further information:

Choose one, or more than one, to suit your interest and budget!

YoungOR 18 – www.theorsociety.com/YOR18 – University of Exeter – **9 to 11 April 2013**.
<http://www.theorsociety.com/Pages/Conferences/YOR18/YOR18Exhibition.aspx>

YOR18 includes excellent Plenary speakers and streams ranging from Analytics to Soft Systems and aims to facilitate knowledge sharing between young academics and practitioners with up to ten years' experience in O.R.

It is a great opportunity to meet the people who will be at the forefront of the profession for years to come.

KIM2013 – www.theorsociety.com/KIM2013 – Forest of Arden Hotel, Meriden – **4 to 5 June 2013**

<http://www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013Sponsors.aspx>

<http://www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013Exhibition.aspx>

This is the OR Society's inaugural Knowledge and Information Management conference. Knowledge Management is a key process in understanding organisations and their use of resources. The theme, Sustainable Quality, is relevant to organisations and individuals working in any sector of the economy.

OR55 Annual Conference – www.theorsociety.com/OR55 University of Exeter – **3 to 5 September 2013**

Our annual conference will once again offer a wide variety of interest on many topics, a great Practitioner day, the prestigious President's Medal awards and much, much more. Please contact Hilary Wilkes re OR55.

For more information about sponsorship and exhibition opportunities, or anything to do with our conferences, please contact Hilary Wilkes on hilary.wilkes@theorsociety.com for further information.

<OR>

YOUNGOR18 - PLENARY SPEAKERS

ANTUELA TAKO, CONFERENCE CHAIR

Introducing our Plenary speakers

We have three very eminent Plenary speakers for our YoungOR18 conference in Exeter on 9, 10 and 11 April 2013.

They are: -

Amanda Gregory, *Centre for Systems Studies, Business School, University of Hull*

Title: Continuous Improvement: Past, Present and Systemic Future

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



Dr. Amanda Gregory is Director of Learning and Teaching in the Business School at the University of Hull. Prior to joining the Business School, Amanda was the research worker on a national project funded by the Leverhulme Trust to design evaluation procedures for Councils for Voluntary Service (CVS). This work provided the basis for her doctorate, awarded in 1995. This led to Amanda holding several prominent academic positions including: Deputy Director of the Centre for Systems Research and the Director of the Community Operational Research Unit, Lincoln School of Management, and Head of the Management Systems Group in the Business School at the University of Hull. She is the Deputy Editor of the journal *Systems Research and Behavioral Science*, and has held posts on both the Executive Committee of the UK Systems Society and the International Federation for Systems Research.

Amanda's current consultancy and research interests relate to, and the use of systems approaches to support management decision making, project management, participatory forms of evaluation and interdisciplinary research. She is currently engaged in the facilitation of workshops on using systems approaches for continuous improvement in policing, education and community action. Amanda is also a director of the recently launched Institute for Continuous Improvement in the Public Sector (ICiPS).

Geoff Royston, *President of the Operational Research Society*

Title: O.R. - a 2020 vision?

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



Dr Geoff Royston is former Head of Strategic Analysis and Operational Research in the Department of Health for England and a former Chair of the Government Operational Research Service. He is now an independent analyst and researcher and is currently President of the OR Society. He has had a wide range of activities and responsibilities involving analysis, modelling and research to inform the design, implementation and evaluation of evidence-based policies and programmes in the health field.

He has also worked on information and communication technology in the health sector, has been an adviser to the UK communications industry regulator (Ofcom), and led the design and launch of the national telephone advice service *NHS Direct*.

He has been an external examiner for postgraduate courses in operational research and management science, has served on both scientific and medical UK Research Council panels and is a member of the editorial board for the journal *Health Care Management Science*.

He has experience in the international health arena including being a consultant for the World Health Organisation, a member of the expert advisory panel for the HIFA2015 (Healthcare Information for All) initiative and a long standing member of the European Working Group on Operational Research Applied to Health Services.



Elizabeth Shepherd, *Director Business Intelligence and Web Analytics, Hotels.com*

As the Global Director of Business Intelligence and Data Strategy at Hotels.com, Elizabeth is responsible for building and running the strategy for the Business Intelligence platforms including Web Analytics and Multivariate testing and the integrated delivery of the in-house Data Warehouse platform and applications. These platforms combined together drive the key reporting and decision making capabilities within Hotels.com..

Details of Elizabeth's YoungOR18 Plenary talk will be published in a future issue of *Inside O.R.*

YOUNGOR18 - CALL FOR PAPERS AND EARLY BIRD BOOKING DISCOUNT

THE PETER CHALK CENTRE, EXETER UNIVERSITY 9, 10 AND 11 APRIL 2013

YoungOR conferences are held every two years and provide a great opportunity for anyone who has been involved in O.R. for ten years or less to give a talk, make new contacts across the YoungOR community and continue their professional development.



Are you presenting, or would you like to present a paper? The on-line submission system is waiting for your Title and Abstract, so don't delay, go to www.theorsociety.com/yor18, as soon as possible.

Please Note: The final deadline for your abstract to be submitted is 28 February 2013, however, if your abstract is submitted and accepted before 31 January 2013, you can book online and qualify for the early bird reduced booking rate. (See Booking and Payment below). All bookings received after 31 January 2013 will be charged at the standard booking rate. So, we'd really like to hear from presenters sooner.

The streams include Analytics, Consulting, Criminal Justice, DEA, Defence & Security, Disaster Management, Energy, Health, Infrastructure, Manufacturing, MCDA, Optimisation, Revenue Management, Service Management, Simulation, Soft Methods, Strategy and Sustainability, Supply Chain and System Dynamics.



Peter Chalk Centre lecture room

Some Important Deadlines:

10 December 2012	Early bird booking opened
31 January 2013	Deadline for early bird bookings
01 February 2013	Standard booking opens
28 February 2013	Final deadline for title and abstract submission
8 March 2013	Receive notification of acceptance by stream leaders
9-11 April 2013	Attend conference

Booking and Payment. The website is now live for bookings and payments online. For the first time, the OR Society are pleased to offer the YoungOR conference an early bird reduced booking rate. However, for budgeting reasons, the deadline to qualify for this reduced rate has to be no later than 31 January 2013.

Therefore, if you are presenting a paper, make sure your abstract has been submitted and 'Accepted' in time to take advantage of the reduced rate. See '**Please Note**' details above.

So take the opportunity to present your work to your peers in a supportive environment, while learning about how O.R. techniques have been used in a wide range of applications. With plenary talks by keynote speakers, interspersed with parallel streams and a comprehensive social programme, the YoungOR conference facilitates sharing of best practice and enables attendees to learn about new areas where O.R. interventions can make an impact – and have some fun!

YoungOR 18 will be held at the Peter Chalk Centre, a multi-purpose conference suite at Exeter University. For more details, and to book online, go to www.theorsociety.com or contact Hilary Wilkes at hilary.wilkes@theorsociety.com or by phone on 0121 233 9300.



'WITHOUT MATHS, WE CAN'T COUNT ON OUR JOBS'

HEADLINE FROM THE TIMES, 26TH JULY 2012.

RICHARD EGLESE



'This is the first time such an analysis has been attempted in the U.K. and represents a first step in evaluating the economic impact of investment in mathematical sciences research.'

What contributes 10% of jobs and 16% of Gross Value Added (GVA) to the UK economy?

The answer, according to an independent study carried out by Deloitte and commissioned by the Engineering and Physical Sciences Research Council (EPSRC) and the Council for Mathematical Sciences (CMS), is mathematical sciences research. A final report of the study to measure the economic benefit of mathematical sciences research in the UK has recently been published and is now available from the EPSRC website at <http://www.epsrc.ac.uk/ourportfolio/themes/mathematics/publications/Pages/default.aspx>.

This is the first time such an analysis has been attempted in the U.K. and represents a first step in evaluating the economic impact of investment in mathematical sciences research. The headline figures look impressive and should help to make the economic case for the benefits of Government spending in this area in order to help the economy to improve.

Several examples are given of areas where mathematical sciences research has had an impact that people will recognise in their daily lives. For example:

- Smart-phones which use mathematical techniques to maximise the amount of information that can be transmitted
- Weather forecasting is based on complex mathematical models
- The latest Hollywood blockbusters take advantage of the mathematics behind software for 3D modelling to showcase cutting-edge special effects
- Elite athletes at the 2012 Olympic Games used tools based on sophisticated maths to maximise their performance.

These examples would probably not be categorised as operational research. So do O.R. applications feature in the report? Sadly, although O.R. is mentioned, there are few examples of the use of O.R. For example, another example given is healthcare where insights from fluid mechanics are used to better understand blood-related diseases to save lives. There are also sections on modelling of diseases and testing new drugs and treatments. But there are no examples of the modelling of the processes in a hospital or a health service where O.R. studies can make a big difference to what can be achieved with limited resources.

However the importance of business analytics does feature in the report. The report states that 'according to research carried out by Vanson Bourne, the majority – 60% - of private sector organisations believe the growth of data analytics is the most important factor in increasing growth in UK businesses.' Examples are given of the analysis of 'big data' such as the work in Tesco for the grocery market.

Some of you may be wondering what sort of methodology was used to estimate the headline figures shown at the beginning of this article. There are challenges in defining what is meant by mathematical sciences research, how to take account of the fact that some mathematical research is not applied until many years after it has been published and in separating the impact of

mathematical science research from that of other disciplines. These issues are all discussed in the report.

Essentially, there was a three-stage process which first identifies occupations that can be categorised as 'mathematical science occupations'. These are occupations that are directly involved in the generation and application of mathematical sciences research. These occupations are then allocated across different sectors of the UK economy using data provided by the Office of National Statistics. Finally an economic input-output model is used to estimate the GVA attributable to mathematical sciences research. Details of the approach are given in the report.

Now any model aiming to estimate these figures can be criticised for its inherent approximations. However this methodology has the advantage that a similar approach has been used by Deloitte to estimate the economic impact of other disciplines, so some comparisons can be made. For example, a report for the Institute of Physics by Deloitte on 'The Importance of Physics to the UK Economy', published in October 2012, states that jobs in physics-based sectors accounted for about 4% of all UK jobs and the direct GVA in physics-based sectors amounts to an 8.5% share of the total UK GVA.

Generally I believe that those of us in O.R. should welcome the

publication of this report that demonstrates the difference that mathematically based modelling can have to impact society and promote economic benefits. The EPSRC and the CMS are to be congratulated for sponsoring the study to show the value of what mathematics, including operational research, can do.

Finally, I am writing this leader in my last month as a member of the Board of the Society as I finish my term as Past President. In January 2013, I shall return to being an ordinary member of the Society. My four years as President-Elect, President and Past-President seem to have flown by very quickly. I am very grateful to the hard work and dedication of the staff in the Society office and I continue to be impressed by the insights and contributions of the members of the Board and Council. I am very grateful for their support.

The Society continues to provide many valuable services and opportunities for its members, but most of these rely on the enthusiasm and commitment of individual members who are willing to get involved. I hope that many will continue to participate in Society activities. I feel that I am leaving the leadership of the Society in good hands and hope and expect it to prosper in the future.

<OR>

Department for Transport



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OPEN ACCESS – YOUR QUESTIONS ANSWERED

ROS PYNE, SENIOR PUBLISHING EDITOR, PALGRAVE MACMILLAN

As regular readers of this magazine will be aware, open access (OA) has been a hot topic in scholarly publishing of late.

In October 2011 David Willetts MP, Minister for Universities and Science, established the independent Working Group on Expanding Access to Published Research Findings, chaired by Dame Janet Finch (the 'Finch Group') to examine how UK-funded research findings could be made more accessible, and in April 2012 Willetts announced his support for the general principle that publicly-funded research should be publicly available. The Finch Report, published in June 2012, expressed strong support for open access publication for the outputs of publicly-funded work, advocating 'funder-pays' (gold open access) schemes. Subsequently Research Councils UK (RCUK) and its constituent bodies amended their guidance to mandate OA publication from 1 April 2013 for outputs of projects which they fund.

This article is intended to give a brief overview of the key terms and debates in open access publishing, and to offer some guidance to readers concerned about implications for publishing their own work, particularly in the UK.

journal website, e.g. in a subject or university repository, or the author's homepage.

- OA article is not necessarily the version of record - it could be the typeset PDF *or* the author's final version after peer review but before typesetting.
- Open access publication may be subject to an embargo period (though an embargo will not apply in all cases).

Will I still have to assign copyright in my open access article to the journal publisher or society?

Copyright assignment is generally understood to be incompatible with open access. You should expect to retain copyright in articles which you publish OA and instead sign a 'licence to publish' allowing the journal to publish your work.

How 'open' is open access publication: what can others do with my work if it is published open access – and how can I be sure an article will remain open access in perpetuity?

The accepted form of outbound licensing for open access articles is a Creative Commons licence (<http://creativecommons.org/licenses/>). Creative Commons licences enable creators of content to retain copyright while allowing others freely to copy, distribute, and make some uses of their work – at least non-commercially.

Six Creative Commons (CC) licences are available. Every CC license also requires those re-using or distributing a work to credit the original creator. Some of the licenses place restrictions on what others may do with the work, for example preventing commercial re-use or derivative works. Amongst funders support is now coalescing around the most unrestrictive of the CC licences, 'CC-BY' (or 'attribution only') to support maximum re-use including data-mining:

CC-BY: allows others to distribute, remix, tweak, and build upon the article, even commercially, as long as they credit the author(s) for the original creation. This is the most accommodating of the licenses offered and allows maximum dissemination and use of licensed materials.

Creative Commons licences are irrevocable.

Is publication via gold open access faster than regular publication?

If a journal already has an Advance Online Publication (AOP) option then in most cases OA publication will not be faster because articles are already being published online as soon as possible after acceptance.



1. About OA

What is 'open access'?

Open Access (OA) refers to content that is freely available online.

What are 'gold' and 'green' open access?

In scholarly publishing, there are two broad categories of open access: green OA and gold OA.

Gold open access:

- OA article is freely available in the online journal.
- OA article is the version of record, i.e. publisher's typeset PDF.
- Article is made open access immediately on publication.
- Typically an Article Processing Charge (APC) is levied by publishers for gold open access.
- This option was advocated by the Finch Report.

Green open access

- Article is made freely available but somewhere other than the

If a journal does not usually publish articles online ahead of print then it would be expected that it would offer this service for gold OA articles; for such journals OA publication may be faster than regular publication.

Does open access mean low quality?

Absolutely not. Many high profile and respected journals now offer an open access option for individual articles (you can read more about the OR Society's OA options below). Meanwhile, more and more fully -OA journals are launching with high profile editorial boards and a high standard of content. Science, technology, engineering and maths (STEM) disciplines have led in this regard, with so-called OA 'mega-journals' such as *PLoS ONE*, *Nature's Scientific Reports*, and *BioMed Central*, and well-respected green OA programmes such as arXiv. Similar initiatives are beginning to emerge in business and management.

2. Funders

My work is funded by a UK Research Council. Do I need to publish via a particular kind of OA to meet funder mandates?

Typically, yes. For example, the following policies will apply to all peer reviewed research papers submitted for publication from 1 April 2013 which are the outputs of research wholly or partially funded by UK Research Councils:

- EPSRC outputs: Gold OA with a CC-BY licence is required. Green OA is not acceptable.
- ESRC outputs: *Either* Gold OA with a CC-BY licence, *or* Green OA with a minimum embargo of 6 months after first publication in a journal.

For a summary of all *current* policies across a range of funders, visit: <http://www.sherpa.ac.uk/juliet/>. (Note that this site will not display the new UK research council policies until April 2013.)

How will the UK Research Councils fund APCs for gold OA?

The UK Research Councils have indicated that they are committed to providing funding for APCs in the long term and have announced a block grant funding mechanism intended to allow 45% of Research Council-funded papers to be published via gold open access in 2013, rising to 75% of papers in 2017/18. The remaining papers are expected to be delivered via the green open access model.

As a transitional measure, the UK government has made available some funds for payment of APCs at university level.

My work is 'publicly funded' in that my department is supported by HEFCE funding, but is not directly funded by a research council grant – do I have to publish OA?

Currently, no.

Do any non-UK funders have OA mandates?

The European Commission has indicated broad support for OA publication of work which it funds, but has not yet established a clear policy or introduced a mandate.

In the US the picture is mixed: while there is no equivalent of RCUK, the National Institutes for Health, a major funder in this area, has long mandated OA, and a bill is currently going through Congress advocating the extension of this mandate to all biomedical research. Longer-term, we will watch closely to see if US funders in other disciplines begin to move towards OA.

There is no obvious driver for OA publication in Asia.

3. OR Society journals

Do the OR Society journals offer open access publishing options?

From 1 January 2013 gold OA publication will be available – on payment of an APC – for all articles accepted for publication in all OR Society journals (JORS, EJIS, KMRP, JOS, HS and OR Insight). Authors of articles published in previous issues of OR Society journals may also pay for their articles to be made OA retrospectively if they wish.

palgrave open

OA publication in the OR Society journals is provided via the Palgrave Open programme (<http://www.palgrave-journals.com/palgraveopen/index.html>). Palgrave Open offers authors of accepted primary research papers the choice to pay an Article Processing Charge (APC) in order for their article to be made available to non-subscribers immediately upon publication.

Palgrave Open is a 'hybrid' OA programme, meaning that the journals remain primarily subscription products with most articles still pay-walled. It is a 'gold' open access option in that articles are published open access immediately upon publication, and the open version is the final, typeset version of the article and is published within the online and print journal.

Additionally, subject to an embargo period authors retain the right to self-archive their own version of their articles (green OA): 18 months after publication of an article in a journal issue, authors may self-archive the final, accepted version of their paper (after reviews and revisions, but prior to typesetting) on their own website or in a university or subject repository. For full details on this and other retained rights please see: http://www.palgrave-journals.com/pal/authors/rights_and_permissions.html#Self

Continued on next page



Continued from previous page

archiving-policy.

How much is the Article Processing Charge to publish OA in OR Society journals?

From 1 January 2013 the APC for OA publication in all OR Society journals is £1,600 / \$2,600.

What if I don't want to publish my work open access?

All OR Society journals will retain the option for authors to publish their papers free of charge, but these articles will be available to subscribers and Society members only. To be clear, there will continue to be no charge to authors for publication of non-OA articles in the Society's journals.

What about other journals I publish in? Is there a quick way to check if a journal / publisher's OA policies are compliant with my funder's requirements?

Many major OR journals offer OA publishing options. Visit <http://www.sherpa.ac.uk/romeo/> for a summary of policies by publisher, or check individual journal websites for details.

More information

The Finch Report

<http://www.researchinfonet.org/publish/finch/wg/>

Research Councils UK – OA Policy [16 July 2012]

<http://www.rcuk.ac.uk/media/news/2012news/Pages/120716.aspx>

Research Councils UK – Announcement of Block Grants to Fund APCs [8 November 2012]

<http://www.rcuk.ac.uk/media/news/2012news/Pages/121108.aspx>

EPSRC Policy on Access to Research Outputs - FAQs

<http://www.epsrc.ac.uk/about/infoaccess/Pages/accessfaqs.aspx>

SHERPA: Securing a Hybrid Environment for Research Preservation and Access

<http://www.sherpa.ac.uk/index.html>

Palgrave Open

<http://www.palgrave-journals.com/palgraveopen/index.html>

The information and opinions within this article are for information purposes only and do not constitute legal or other professional advice.



Management and Business Development Fellowship in Operational Research

Salary: Grade 8, £37,012 to £46,486
Job Reference: A587

If you've been working in OR/MS for between 5 and 15 years and would like to move into academia, the Lancaster University Department of Management Science is recruiting to a Management and Business Development Fellowship partly funded by ESRC.

We'll work with you to identify and develop a research area in OR/MS and if you don't already have an OR-related PhD, you'll be expected to gain one whilst on the Fellowship. You'll need to have at least an excellent first degree and will need to demonstrate that you wish to move into a research active career as an OR/MS academic.

Informal enquiries; Prof Mike Pidd (01524 593870, m.pidd@lancaster.ac.uk) or Prof Richard Eglese (01524 593869, r.eglese@lancaster.ac.uk)

Full details at: <http://hr-jobs.lancs.ac.uk/>.



THE HUMOR COLUMN

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

You'll be pleased to know that I managed to find a topical contribution for this month's column.

A young man named John received a parrot as a gift. The parrot had a bad attitude and an even worse vocabulary. Every word out of the bird's mouth was rude, obnoxious and laced with profanity. John tried and tried to change the bird's attitude by consistently saying only polite words, playing soft music and anything else he could think of to clean up the bird's 'act'.

Finally, John got fed up with his lack of progress and he yelled at the parrot.

The parrot yelled back.

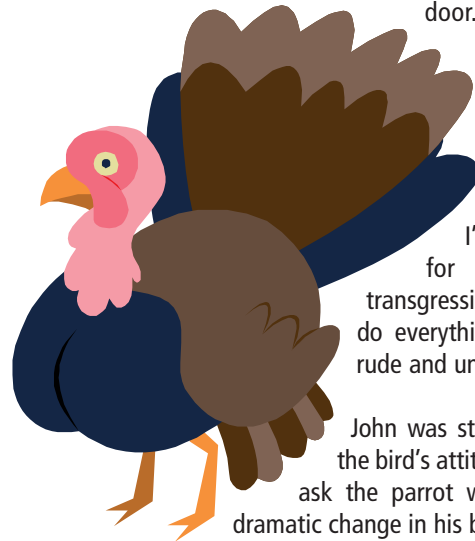
John shook the parrot's perch, but the parrot got angrier and even ruder.

In desperation, John threw up his hand, grabbed the bird and put him in the freezer.

For a few minutes the parrot squawked and kicked and screamed.

Then suddenly there was total quiet. Not a peep was heard for over a minute.

Fearing that he'd hurt the parrot, John quickly opened the freezer door. The parrot calmly stepped out onto John's outstretched arm and said, 'I believe I may have offended you with my rude language and actions. I'm sincerely remorseful for my inappropriate transgressions and I fully intend to do everything I can to correct my rude and unforgivable behaviour.'



John was stunned at the change in the bird's attitude. As he was about to ask the parrot what had made such a dramatic change in his behaviour, the bird spoke up, very softly, 'May I ask what the turkey did?'

<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:

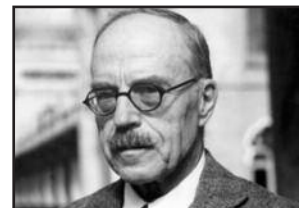
Merry Christmas & A Happy New Year



SIR HENRY TIZARD

PART 6 – BRITAIN AT WAR

JOHN CROCKER



At 11:00am on Sunday 3rd September 1939, as Big Ben chimed Britain out of peace, the nation had the basis of an effective defence from air attack as a result of the work of the Tizard Committee and the Biggin Hill Experiment.

There were still major gaps, radar could not pick up low flying aircraft and although radar worked equally well at night as in the daytime, alas, pilots did not. A country is also unlikely to win a war purely by defending itself; Britain lacked the means to take the war to the enemy.

Tizard was, at this time, Scientific Adviser to the Chief of Air Staff (Air Chief Marshal Sir Cyril Newall). This was a purely advisory role with no executive powers and unpaid. (Tizard 'made it a rule to take no fees of any kind for work, either pre- or post-war' while he was Rector of Imperial College.) Newall spent a lot of time with Tizard trying to understand how best he might use the services of a really practical scientist.

Tizard was not so much the virtuoso as a great conductor. 'If he couldn't himself play the oboe he knew where to find the best oboist, fit him into his orchestra and, from the score in front of him, bring him in at the right moment.'

Throughout the war he desperately tried to get the various committees to concentrate on a small number of ideas, in particular, those which were thought likely to be able to make a major difference. He believed 'that there are not half a dozen new things that we can hope to introduce during the war which would have any material effect on winning it'. Tizard's list for the RAF was: (1) airborne radar; (2) production of centimetric transmitters and receivers; (3) IFF; (4) improved means of radio navigation; (5) jet propelled aircraft; (6) predictor sights for aircraft guns; (7) stabilized bombsights and; (8) short aerial mines.

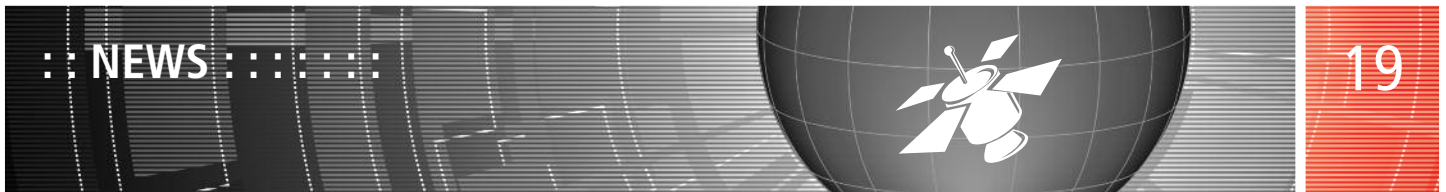
From his diary: 6th September 1939: Exeter to discuss gunnery problems at the Armament Experimental Unit (with G.T.R. Hill); 7th Farnborough; 8th H.M.S. *Vernon* at Portsmouth; 9th Air Ministry; 11th Christchurch – Army's radar establishment (with Watson-Watt); 13th Balloon and Fighter Commands; 15th Boscombe Down investigating armament problems (with Melville Jones); 16th Exeter (again) and 17th Oxford and so on. On one day he could be advising on Heinkel wireless equipment, magnetic detection of submarines and pocket wireless equipments and on the next the armouring of bombers, problems of low-level bombing, construction of relief maps and better inter-communication between air-crew and the next with experts seeking his advice on towed bombs, aerial mines and plans for photographic reconnaissance. When in London, he would retire at the end of the day, first to the Athenaeum (probably to discuss various problems over dinner), then to Imperial College where he would get the College Secretary out of bed to go over and sort out the college problems with 'uncanny speed and accuracy'.

'If he couldn't himself play the oboe he knew where to find the best oboist, fit him into his orchestra and, from the score in front of him, bring him in at the right moment.'

Although there were the inevitable teething troubles with the Chain Home system most of these were sorted out during the Phoney War although not without its embarrassing moments. Tizard was most concerned about airborne radar and managed to get Professor Mark Oliphant, Birmingham, to divert his attentions to the development of centimetric radar (i.e. very short wave) which eventually led to the Randall and Boot cavity magnetron¹.

As we saw last time, Tizard had managed to procure a large quantity of uranium ore essentially as 'insurance'. He was not convinced that a 'uranium bomb' was either possible or feasible. At that time, the war with Germany was not expected to last very long, almost certainly not long enough to bring a uranium bomb to fruition.² Of major concern, however, was whether Germany could and would produce such a weapon first. A number of Jewish and anti-Nazi scientists had escaped to Britain including Otto Frisch and Rudolf Peierls who were now working together in Birmingham and had written a memorandum in two parts. The first part was highly technical but explained how such a bomb would work and be constructed. The second part, which it appears only Tizard ever saw, explained its potentials, the difficulties that would be encountered in its use (e.g. long-lasting radioactive fallout) and the moral and ethical implications. What caught Tizard's attention was the size; the critical mass was just one pound of U²³⁵ and hence perfectly feasible as a weapon. Even after this revelation, Tizard was still sceptical (as were many others) but he continued to lend the MAUD (previously Thomson) Committee his support provided not too many valuable resources were diverted onto this project.

It would appear that it was also Tizard who first suggested 'interviewing' refugees to get an idea of what advances Germany had made scientifically and hence what capability and weapons they might possess. Many of Germany's top scientists before 1938



were Jewish. Those with the right foresight and connections escaped to Britain or North America but sadly many didn't.

By June 1940, things had taken a turn for the worse for Sir Henry; the Germans were well into France but more importantly, Churchill had replaced Chamberlain as Prime Minister which had elevated Lindemann and seen several of Tizard's closest supporters replaced.

Things soon came to a head. Tizard wrote to Hankey to advise him that he was available as his work for the Air Ministry had decreased 'considerably'. This had not stopped him from coming up with some good ideas such as scattering light bulbs containing mustard gas on the beaches and using Indian despatch riders for the more important orders as the Germans would not be able to disguise themselves as Indians after it had been alleged that German despatch riders were disguising themselves by wearing Allied uniforms.

On 19th June Tizard tendered his resignation on the grounds that his advice was basically being ignored and that, in essence, there wasn't room for both him and Lindemann to act as scientific advisors. The fact that Tizard had felt that too much undue haste had been taken over finding counter-measures to *Knickerbein* without any scientific proof that it either existed or was of any value to the enemy was unfortunate since it proved to be one of his very few misjudgements.

Upon hearing of his resignation practically the whole scientific community and the top people in the Air Force and Air Ministry came to his support. Hill and Blackett also resigned. Hill, who was by this time an MP, also wrote an extremely strongly worded memorandum making it clear that reliance on Lindemann as scientific adviser was putting the country at very high risk. It cited some 14 cases where valuable time, money and resources had been wasted following up his suggestions.

In the meantime, Tizard continued to provide whatever help and advice he could to whomsoever sought it. This included, for example, setting up a factory in Canada to produce bombers using American engines. He also strongly recommended that as many people as possible from the UK should be sent to Canada to work on design and production where they were out of reach. To make sure the valuable work of the Tizard Committee was not lost or destroyed, he handed all necessary papers, minutes, etc to Professor Fowler to take to Canada.

Not long after, in September 1940, after radar and the Chain Home system had proved its worth in the Battle of Britain, Tizard headed the British Technical and Scientific Mission (informally known as the Tizard Mission) to the States. An underlying purpose of this mission was to encourage the USA to come into the war on the side of the Allies although its primary [overt] purpose was to encourage researchers across the States to engage in activities which would directly benefit the Allied cause. To this aim, Tizard was about to share with the Americans our most closely guarded scientific secrets. Cockcroft believed, for example, 'Our disclosures had increased the power available to US technicians [in the field of short-wave radar] by a factor of 1000'. The concept of this mission was clearly Tizard's who had first made the suggestion in November 1939, some considerable time before Churchill took over from Chamberlain. In fact Churchill and the Government were far from convinced – indeed, the Admiralty were strongly opposed believing

'He understood the practical problems of the Services and industry, and respected their outlook, but he also had a feeling for the young research worker filled with enthusiasm and bright ideas but with very little practical background.'

that any information handed over would immediately find its way through enemy agents back to Germany putting them at an enormous advantage.

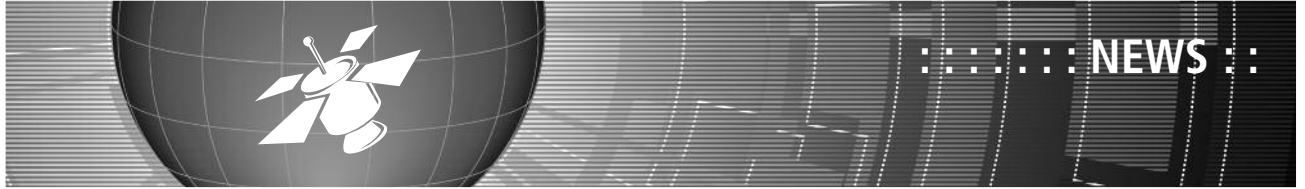
The debate went on for some time. A.V. Hill was sent out to Washington in February 1940 and reported back that US scientists were very keen to help the British. He also suggested that there were literally hundreds of airmen willing to join forces with the RAF, provided they were not required to swear allegiance to the King. But it took until 25th July before the UK Government authorised the Mission and that it should be led by Tizard.

Tizard wrote his own brief to which Churchill agreed, 'To tell them what they want to know, to give them all the assistance I can on behalf of the British Government to enable the armed forces of the U.S.A. to reach the highest level of technical efficiency.' He also managed to secure three experienced serving officers Capt Faulkner, RN, Lt-Col Wallace, Army and Grp Capt Pearce, RAF. On August 14th, the party finally met up in Poole harbour before boarding the flying boat for Foynes, Co Limerick in the Shannon estuary not far from Shannon airport. From there they flew to Botwood, Newfoundland (not far from Gander) arriving shortly after midnight then on to Montreal before being driven to Ottawa. Tizard spent a week in Canada with Dr C.J. Mackenzie, President of the National Research Council of Canada who said of Sir Henry, 'His visit was like a breath of fresh air [...]. He quickly grasped all our difficulties [...]. I could take Tizard into an officers' mess [...] and [he] would talk their language [...]. We moved through different groups – senior political figures, senior military staffs, university people and scientists, and everywhere we went Tizard was at home, and created a most favourable impression. He understood the practical problems of the Services and industry, and respected their outlook, but he also had a feeling for the young research worker filled with enthusiasm and bright ideas but with very little practical background.' (From a letter from Mackenzie to Sir Harold Hartley some 20 years later.)

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

¹ The source of energy in microwave ovens!

² Even though the war lasted many years longer than expected, the bomb was still not available in time to use against Germany.



INTRODUCING THE KIM2013 PLENARY SPEAKERS

BRIAN LEHANEY, CONFERENCE CHAIR

The Knowledge and Information Management Conference (KIM) will be held on 4-5 June 2013 at the Forest of Arden Hotel & Country Club, Meriden.

KIM2013 is fortunate to have three highly experienced and knowledgeable plenary speakers, who provide a mix of academic and practitioner perspectives. These are, in order of presentations:

- Professor John Edwards, Executive Dean, Aston Business School and Editor of *Knowledge Management Research and Practice* (KMRP).
- Trevor Howes, Director, BRM Fusion Ltd.
- Dr. Jay Liebowitz, Orkand Endowed Chair in Management and Technology, The Graduate School, University of Maryland University College

John Edwards *Aston Business School* Message Received and Understood?

Knowledge sharing and knowledge transfer require at least two human parties, a 'sender' and a 'recipient'. This still applies when some form of codification acts as a bridge between the two parties. At its most basic, it is sending a message of some kind from one person to another. As with all messages, two key questions are: will it be received? And if it is, will it be understood? This plenary talk will focus on the continuing imbalance between the amount of attention paid to the 'sending'/supply side of KM (especially knowledge sharing/transfer) at the expense of the 'receiving'/demand side. For example, even such a well-known concept focussed on the recipient as the idea of 'sticky knowledge', has actually been named in a way that appears to flag it as a 'sending' issue.

The good news is that the imbalance does seem to be reducing. However, the historical difference in emphasis means there is often still a disconnection between the two ends of the activity, with a great deal of KM work still focussing on one party or the other exclusively. In the past year I have still seen articles on how to get people to contribute to a repository which don't consider who uses what's there (though the ontology community is integrating the two parties well), or incentives for people to share knowledge that only look at the giver.

This talk will offer some suggestions – based on process considerations – of ways to give the best possible chance that the message is both received and understood.



John S Edwards is Professor of Operational Research and Systems at Aston Business School, Birmingham, and is currently Executive Dean. He has a BA with First Class Honours in mathematics and a PhD in operational research, both from Cambridge University. His main interest in research

has always been in how people can and do (or do not) use models and systems to help them do things. He has conducted major research projects with Corus, the Thomas Cook Group, and in the National Health Service. Since the 1990s, he has been researching into knowledge management.

At present his principal research interests include how knowledge affects risk management, investigating knowledge management strategy and its implementation; the relevance of technology to knowledge management and the evaluation of knowledge transfer programmes. He has published more than 65 articles in refereed journals, and is founding editor of the OR Society journal *Knowledge Management Research & Practice* which, in 2011, became the first knowledge management journal to gain an impact factor.

Trevor Howes *BRM Fusion Ltd* Practitioner insights into realising sustainable benefits from planned change using collaboration, codification and technology

Analysis, design and delivery of change are mostly delivered by fragmented teams with no clear view of what decisions will add the most value to customers. Organisations are missing out on significant opportunities to cut through confusion, identify co-developed insights and deliver greater results.

Trevor will describe an approach that brings people and teams together, captures and uncovers implicit needs and key outcomes with design and project information into a single model. This is then used to align teams and perform analysis that shows the impact of different decisions on cost and business benefits expected through the life of the project/ investment. Once decisions are made then delivery and on-going change can be managed to maintain a cross-team focus on the delivery of value.

Trevor draws on his KM and change background to describe how this works in practice by drawing on case studies and personal experience of helping organisations deliver greater results.



Trevor Howes is an international authority on realising benefits from change and getting diverse groups to collaborate, work differently and produce significant and sustainable results. He is the co-author of *Knowledge Management - A blueprint for delivery* which is on knowledge management and benefits-led change.

Trevor recently led communities in Fujitsu UK and also was the lead

for Requirements Management, Business Cases and Portfolio Management areas as well and being on the business consulting group's management team for five years. He now works with diverse organisations such as IBM in Australia, Network Rail and the Cabinet Office as well as small and medium organisations.

Trevor is also on the core committee of the Association of Project Managers (APM) group for benefits management that helps to shape the future of the profession. He is a Chartered Engineer with an MBA and is also an accredited programme manager.

Trevor co-founded BRM Fusion in 2010, which launched the Realisor software that supports how information from across organisations can be mapped on a single page and then used to drive beneficial change. The innovation requires different professional teams to collaborate and visually map information, creating conversations and insights into where to focus investment and effort.

The approach and software uses analytics and draws on information, people, process, structure and culture change and is now used globally. Uniting people with engaging information that forecasts benefits and costs over time based on choices the groups make.

One of the major challenges organisations face is getting people to act differently and in a high quality and sustained way. Trevor believes that knowledge and information management is essential to achieving this..

Jay Liebowitz *University of Maryland University College (UMUC)* **Beyond Knowledge Management: What Every Leader Should Know**

Today's business environment is tumultuous. We have financial meltdowns, global competition tsunamis, and leadership earthquakes. Making proper strategic decisions for the enterprise is a challenge for senior leadership. Organisations are trying to be adaptive, agile, and innovative in order to compete in tomorrow's marketplace, but it is becoming harder to do so given all the internal and external constraints on the enterprise. To help senior leaders better adjust to the changing times and to improve their strategic decision making process, there are ten components that can help their organisations gain a competitive edge: knowledge management; strategic intelligence; globalisation; e-learning; social networking; virtual worlds; technology; human capital; relationships; and innovation. Based on his 2012 book, Liebowitz will highlight some of the key directions in these areas.



Dr. Jay Liebowitz is the Orkand Endowed Chair of Management and Technology in the Graduate School of Management & Technology at the University of Maryland University College (UMUC). He previously served as a Professor in the Carey Business School at Johns Hopkins University. He was ranked one of the top 10 knowledge management researchers/practitioners out of 11,000 worldwide

and was ranked No2 in KM Strategy worldwide according to the January 2010 *Journal of Knowledge Management*.

At Johns Hopkins University, he was the founding Program Director for the Graduate Certificate in Competitive Intelligence and the Capstone Director of the MS-Information and Telecommunications Systems for Business Program, where he engaged over 30 organisations in industry, government and not-for-profits in capstone projects.

Prior to joining Hopkins, Dr. Liebowitz was the first Knowledge Management Officer at NASA Goddard Space Flight Center. Before NASA, Dr. Liebowitz was the Robert W. Deutsch Distinguished Professor of Information Systems at the University of Maryland-Baltimore County, Professor of Management Science at George Washington University, and Chair of Artificial Intelligence at the U.S. Army War College.

Dr. Liebowitz is the Founder and Editor-in-Chief of *Expert Systems With Applications: An International Journal* (published by Elsevier), which is ranked third worldwide for intelligent systems/AI-related journals, according to the most recent Thomson impact factors. ESWA had 1.8 million article downloads worldwide in 2011. He is a Fulbright Scholar, IEEE-USA Federal Communications Commission Executive Fellow, and Computer Educator of the Year (International Association for Computer Information Systems). He has published over 40 books and a myriad of journal articles on knowledge management, intelligent systems and IT management. His most recent books are *Knowledge Retention: Strategies and Solutions* (Taylor & Francis, 2009), *Knowledge Management in Public Health* (Taylor & Francis, 2010), *Knowledge Management and E-Learning* (Taylor & Francis, 2011), *Beyond Knowledge Management: What Every Leader Should Know* (Taylor & Francis, 2012), and *Knowledge Management Handbook: Collaboration and Social Networking* (CRC Press). In October 2011, the International Association for Computer Information Systems named the 'Jay Liebowitz Outstanding Student Research Award' for the best student research paper at the IACIS Annual Conference. He has lectured and consulted worldwide. He can be reached at jay.liebowitz@umuc.edu.

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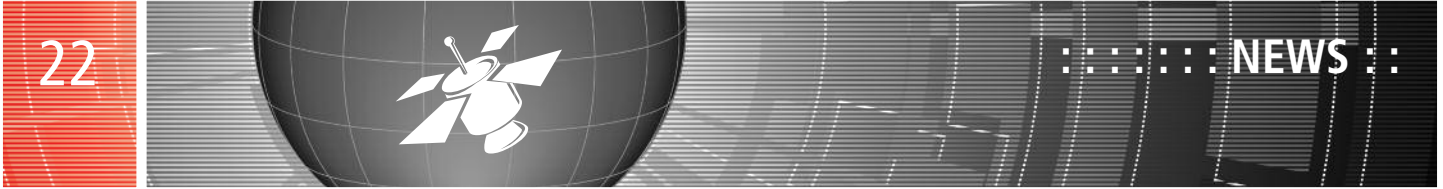
Please check out our website on www.theorsociety.com/KIM2013 or use the following links for further information:-

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If your idea for sponsorship is not listed, please contact hilary.wilkes@theorsociety.com



BLACKETT MEMORIAL LECTURE

JOHN CROCKER

November 29th was a cold, frosty but sunny day so different from the rest of November which had brought so much flooding and disruption to much of the UK.

The ideal day for a brisk walk across Hyde Park where the squirrels were also making the most of the weather to gather in as many nuts as the locals were willing to give them even to running up the leg of one of the donors (fortunately for him on the outside of his trousers). Such playfulness, agility and exuberance without a single gram of fossil fuel in sight.

Into the Royal Society to be greeted by a sea of well-known and, alas, in many cases, well-worn faces. What is the collective noun for a number of presidents – a realm, an anarchy, a pretension, ... I counted at least eight, a similar number of Companions and no doubt even more medal winners. The trouble with being editor of *Inside O.R.* is that one rapidly gets a reputation as being someone to avoid unless you see yourself as a budding journalist.

After the formalities of the award presentations (which hopefully will be reported elsewhere) on to the main lecture. This year we had the great honour of having David MacKay FRS, Professor of Physics, University of Cambridge, Chief Scientific Advisor to the Department of Energy and Climate Change and author of *Sustainable Energy – without the hot air*® (described by Bill Gates as one of the best books on energy ever).

Imagine a picture of an average 'A road' with just one lane in either direction. Traffic flow is around 20 cars per hour at 60 mph (or one car every 80 metres) burning petrol at the rate of 30 mpg. Now imagine a verge on the side of the road. How wide does that verge have to be to replace the petrol with bio-fuel produced from the crops grown on this verge? (Assume 1200 lt per hectare per year.)

MacKay's second most famous quote is, 'Numbers not adjectives' which is a curious contradiction since all numbers are adjectives. With an audience of O.R. people, he was possibly preaching to the converted but nonetheless, it was an important point. He went on to explain that it is not just any number, they have to be in a range that people can understand – it is no good talking about terawatts and megatonnes, one needs to bring it down to nice simple units like kWh (the kilowatt hour) since this is something we all recognise as the unit of electrical energy that we have to pay for every quarter.

A few useful everyday statistics: one 40W lamp burning for 24 hours a day is 1; the food we eat is 3; a bath 5; litre of petrol 10; an aluminium can (to make) 0.6; one flight a year from London to Los Angeles (return) 26; a phone charger left on all day 0.01 kWh per day approximately. These plus all the other things for which we use

energy comes to an average of 125 kWh per person per day in the UK.

If we divide the total land area of the UK by its population we end up with 4000 m² (approximately 1 acre in old money). This now converts to 1.25 Wm⁻² (watts per square metre). The world average, by contrast is around 0.1.

Offset against these usage figures, Prof Mackay then gave some illustrations of energy generation per square metre. Again, these are approximate and averages: wind, 2.5; plants, 0.5; solar (PV), 5.2; tidal, 5; concentrated solar power, 15-20; and nuclear 1000 (based on Sizewell). Using the latest technology to produce power without producing weapons' grade plutonium, the output from a nuclear power station would be even higher. To put both sets of numbers into context, we would need to cover half of the UK with wind turbines to generate the energy we use but less than 10 hectares (25 acres) of land with nuclear power plants.

David's book shows what the implications would be in terms of pollution, CO₂ levels, and many other factors. It gives comparisons of different types of transport, the effects of different life-styles, the benefits or otherwise of different types of insulator and a great deal more. The book is even free online at www.withouthotair.com.

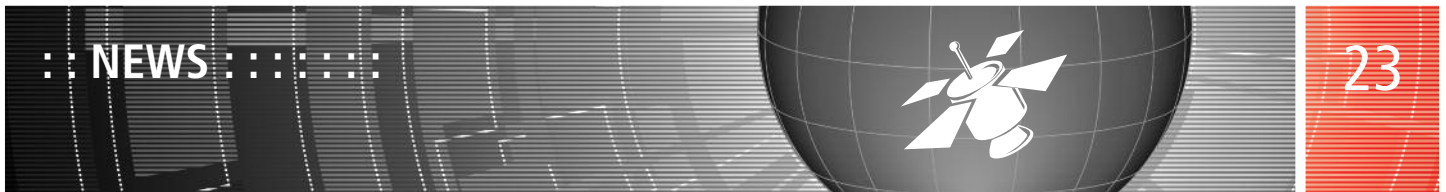
Oh, and in answer to the original question, 8 km or 5 miles.

<OR>

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CRIMINAL JUSTICE SPECIAL INTEREST GROUP MEETING 26 NOVEMBER AT THE MINISTRY OF JUSTICE

SUE MERCHANT (BLUE LINK CONSULTING) AND IAN SEATH (IMPROVEMENT SKILLS CONSULTING LTD)

The CJ sig held its third meeting of the year in London, with many thanks to Vincent Chinegwundoh from the Ministry of Justice, who just managed to find a room big enough to seat the 20 members/speakers who were able to attend our afternoon gathering, chaired by Ian Newsome from West Yorkshire Police.

Members/speakers came from MoJ, police forces, consultancies and academia from many different parts of the country. We were particularly pleased to welcome Steve Precious from the National Police Improvement Agency (soon to be called the National College of Policing) and our four excellent presenters.

Our first speaker, **Rebecca Endean**, the Director of Analytical Services at MoJ, summarised the types of model which MoJ has built and maintains to help policy makers see the effects of possible decisions on the prison population. She also spoke about the use of genetic algorithms which are being used to help model the courts estate and help decide which buildings to retain, and about the use of data envelopment analysis to help compare and improve the efficiency of courts. Rebecca stressed the value of having a mixed team of O.R. analysts, statisticians, economists and social scientists: the team had been so successful that it had managed to grow modestly against a backdrop of savage cuts elsewhere.

Jane Parkin, independent consultant, spoke about the work she had done for the Crimestoppers Trust, the charity which takes anonymous calls and emails from the public about crimes and criminals. She had used PRISM (a simulation package developed by Lanner to help police forces improve the efficiency of generic processes including their call centres) to evaluate a number of options for the rosters of staff working in the call centre and handling emails. Crimestoppers management was most grateful for the consultancy (provided under the ORiTS scheme) and decided that the shifts which gave the best performance for no increase in cost should be trialled from January. The results are awaited with great interest! (*See Inside O.R. September 2012 for more details*).

Chris Smith, Warwick University, described the work he had carried out for Warwickshire police. Amongst other studies he had successfully used soft problem structuring methods to identify ways of reducing wasted call handler time in the Control Room. The WASAN method (Waste and Source Matter Analysis) originated in the nuclear waste industry and takes a whole system view including upstream and downstream impacts to identify sources of waste in the system. A most important part of the work was involving staff and managers in the identification of waste and proposed actions

for tackling it. 76 possible grouped actions were rated against a set of agreed qualitative criteria such as 'alignment with strategy', 'risk to public' and a way forward determined. The talk sparked off a lively debate about how WASAN compared with Lean and 6 Sigma!

Finally **Munira Dossaji**, MoJ, spoke about her work and the lessons she had learnt from trying to benchmark international CJ indicators. She said that the benefits of international comparison include ideas for improving policy making, efficiency, and performance. She had discovered that there is no single consistent source of international information available, there is limited geographical coverage, a lack of an overarching standard for KPIs, different levels of detail available, missing indicators and an inconsistency in terminology. So trying to make sense of the information that was available, especially for non-technical policy makers, was difficult. She had therefore devised a tool for comparing countries. This used 20 indicators and their time series obtained from relevant national websites for 5 countries of interest (including Canada, New Zealand, Finland and Portugal). She had grouped the indicators to show external drivers, internal drivers and the system relationships between the indicators, using for the final outcome indicator the change in prison population. Colour coding had been used to good effect in her single slide comparison chart to show whether an indicator was increasing, decreasing, unchanging or unclear. The 'direction of travel' proxy indicators provided a means of comparison where gaps or inconsistencies in the variety of data sources were present.

If anyone would like more detail about these talks it is hoped that details will be on the CJ website soon, and if anyone would like to join the group please contact Sue Merchant (suemerchant@hotmail.com) for further information.

Next event March 4th Wakefield (Police HQ): speakers to be confirmed.

JOURNALS & SPECIAL ISSUE

CALL FOR PAPERS

SPECIAL ISSUE

The Internet-of-Things: Shaping the new Internet Space CONCURRENCY AND COMPUTATION: PRACTICE AND EXPERIENCE (CCPE)

Further information:

<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-CPE.html>

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

IoT extends the human-centric view of the Internet market space wherein it was thought that the ‘world of humans represented a market space that would reach saturation sometime soon’ (Internet Society, 2012); IoT broadens the device-centric view that predominantly considered computing and electronic devices (e.g., PCs, mobile phones, home electronics, smart cars) as the defining elements of the Internet space.

IMPORTANT DATES

Paper submission deadline: 15 January 2013

Authors will receive initial decision and reviewer comments: 15 April 2013

Final papers due date: 15 June 2013

Final decisions: 15 July 2013

Accepted papers are expected to appear online for early view within 4 months of final decision.

SPECIAL ISSUE

Knowledge Management Research & Practice (KMRP) Sustainable Quality: Knowledge and Information Management

Further information:

www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013.aspx

Abstract: This Special Issue, in conjunction with KIM2013 (the OR Society’s inaugural Knowledge and Information Management conference) is dedicated to the theme of Sustainable Quality. This wide-ranging topic is relevant to organisations and individuals working in any sector of the economy. Knowledge Management has become a key process in understanding organisations and their use of resources and, ultimately, quality is a major differentiating factor when considering goods and services. Sustaining quality requires taking a strategic view that may present short to medium term challenges and knowledge management should be able to help

address such challenges. For large organisations, knowledge management may be seen as an intra-organisation activity, but sustaining quality for small to medium enterprises may require inter-organisational cooperation. Papers that relate to the theme and to knowledge and information management will be welcome. Areas of particular interest include (but are not restricted to) the management, practical application, limitations, implications, lessons learned and challenges related to KM and sustainable quality in the areas of services, education, health and manufacturing.

IMPORTANT DATES (in conjunction with key dates for KIM2013)

KIM2013 conference paper titles and abstracts submitted: 7 December 2012

Full conference papers submitted: 11 January 2013

Notification of outcomes of reviews of conference papers: 1 March 2013

Final manuscripts submitted (for conference): 10 April 2013

Conference: 4-5 June 2013

Final manuscripts submitted for KMRP: 1 July 2013

Electronic publication expected in KMRP: 1 September 2013

CALL FOR PAPERS

CCPE Special Issue on ‘The Internet-of-Things: Shaping the new Internet Space’

Further information at: <http://www.ccpe.net/journalinfo/issues/2013.html#IOT2013>

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

IMPORTANT DATES

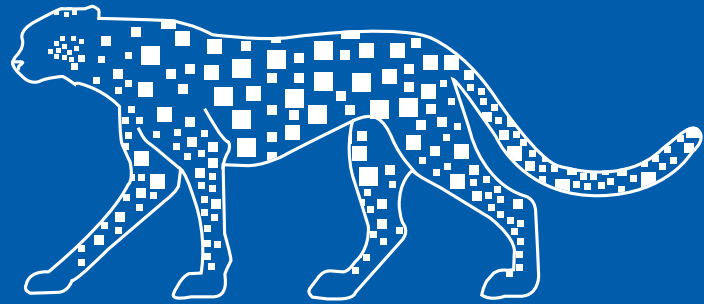
Paper submission deadline: January 15 2013.

The authors will receive initial decision and reviewer comments: April 15 2013.

Final papers: June 15 2013.

Final decisions: July 15 2013.

Accepted papers are expected to appear online for early view within 4 months of final decision.



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WHAT'S NEXT FOR ANALYTICS?

NIGEL CUMMINGS

Precision, personalisation and collaboration are on the agenda for the next wave of applied analytics.



Research done by Gartner suggests that data warehouse layers and OLAP cubes will still have a place with enterprise data, though precision, personalisation and collaboration are likely to be the prime focus in the next generation of analytics applications.

According to Kurt Schlegel, analytics research VP for Gartner, for more precise analytics, data architects should look to augment rather than replace existing operations with an eye toward agility and acceptance of external and varied data sources.

There will be, he said, more acceptance of the use of data discovery tools, especially where there is little training required and as big data frameworks become more visually appealing. This provides an opportunity for industry-specific, trusted data aggregators to fill in enterprise data gaps with as-a-service options.

Already, existing providers of benchmarking and industry analysis are putting together niche offerings that provide the content that many enterprises may not be able to for lack of in-house talent, budget or existing data resources. 'More and more, analytics services will deliver ... easy to consume analytic applications in the cloud that will be very powerful,' he says.

Traditional OLAP methodology will be enhanced too, and enterprises should expect more customisation and personalisation of information segmentations. To this end, the latest analytic capabilities will increasingly be geared toward high-volume forecasting - a greater possibility with more data streams.

Analytic processing is also likely to develop 'a more granular edge', to avoid broad strokes with information that loses customisation possibilities for both end users and their customers. The third area

of business analytics evolution is the most opaque though. It is decision management support. In part 'resurrecting the term decision support'.

Automation and collaboration of the data behind this aspect of business is reserved for the leading edge of analytic maturity for the time being. However, as collaborative applications and semantic layers grow, the analyst says that there is promise for a boom in analytics to handle these typically manual yet critical business decisions.

An example of this would be the buy-in going on in the insurance industry space when it comes to claims processing, a manual but repeated process where brainstorming over systems is showing promise to provide personalised, and real-time responses.

In preparation for these analytics changes, companies should be immediately prepared to map out pressing business problems and create a 'finite list' of analytical enterprise teams. They should also create data discovery tool prototypes to address those business problems and subscribe an analytic industry service relevant to their business area. Within 12 months, companies should assemble teams to tackle high-volume forecasting and granular segmentation, and then, roll out support solutions.

<OR>

'More and more, analytics services will deliver ... easy to consume analytic applications in the cloud that will be very powerful,'

MATHEMATICA UPGRADE

NIGEL CUMMINGS

Wolfram Alpha has upgraded its popular Mathematica application to Version 9, and surprise surprise, it now supports predictive analytics!

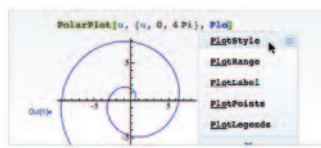
Introducing the Wolfram Predictive Interface

Optimizing your workflow by predicting what you'll want to do next



Next-Computation Suggestions Bar

As soon as you finish a computation, you will get optimized suggestions about what to do next. Press a button to evaluate a new function or bring up an interactive wizard. It's a new interface paradigm that lets you navigate and discover functionality throughout the Mathematica system.



Context-Sensitive Input Assistant

Intelligent auto-completion and highlighting for functions, options, and other elements of Mathematica. Integrated with Mathematica's unrivaled documentation system.

The latest version of the popular application has been equipped with 400 new capabilities, and a new emphasis on usability and automation. The automation and data science focused technology integrates computation into complete workflows.

A highlight of the new application is Wolfram's 'Predictive Interface', a collection of intelligence works which acts as combined software suite to 'intelligently suggest' what to try next based on heuristics and data gathered from millions of Wolfram Alpha queries.

According to Conrad Wolfram, director of strategic development, 'Even before 9, Mathematica was the broadest, deepest computation system in the world. [But] as scope increases, so do usability challenges. Our new Predictive Interface really helps. Getting Mathematica to think ahead means not only newcomers but all Mathematica users can access its power far more effectively.'

Wolfram himself often talks of the need to 'democratise computation' as his team works to optimise what's possible in each field of data science. Analysis and visualisation of statistical data and social networks (e.g. Facebook, Twitter) is fully integrated with existing capabilities such as instant interactivity, computable documents, and symbolic computation.

Mathematica 9 also offers formulas to ease social networking analysis, three-dimensional modelling and other computationally complex calculations. It includes a predictive analysis feature that provides users with suggestions of how their work can be further refined through use of the software.

Mathematica 9 is the first version of the software that allows researchers to analyse patterns of behaviour in social networks such as Facebook. A new function allows users to pull in data using APIs (Application Programming Interfaces) from social networks. The

data then can be analysed and visualised.

According to Wolfram, the feature 'promises to be very valuable not only for professional data scientists, but also for math and computer science students who want to jump immediately to the frontiers of one of the hottest current areas'.

The Mathematica application provides access to a considerable repository of mathematical formulas, and Version 9 can also handle a number of new, tricky differential equations, such as equations with discontinuities; a model of a ball bouncing on a surface, for instance. More algorithms have been added for signal processing, control system modelling and vector analysis.

The purpose of these new algorithms is to reduce the amount of formulation researchers must do; computations in general relativity that even recently seemed like major research projects, now happen in mere seconds. This is also the first version of the software with built-in integration with the R programming language for statistics.

Mathematica also contains visualisation tools, and this release will allow users to view their data in three dimensions. It can export very large image processing tasks to more powerful machines, and provide live data visualisations that can be distributed to other users.

The new Wolfram Predictive Interface can suggest actions a user can take based on the context of the workspace. Another feature is the ability to calculate with units of measurement to its namesake software. Users can now add kilometres and miles together, or compare pounds to kilograms. The software supports units of measurement from a wide variety of sciences, including physics, chemistry, astronomy and engineering.

For the home edition, Mathematica 9 starts at £195 for a one-time license, or £95 per year. The standard edition starts at £2,035, or £815 per year and the enterprise version costs £5,695. Mathematica 9 runs on Windows 8, Windows 7, and Windows Vista; the Windows version of the application also works on PCs running Windows XP with Service Pack 3 or later. The application also works on any 64-bit Intel-powered Mac running OS X 10.6 or later. More information on Wolfram Mathematica 9 can be found at: <http://www.wolfram.com/mathematica/>



OUTDATED BUSINESS MODEL? FIX IT WITH PREDICTIVE ANALYTICS!

NIGEL CUMMINGS

Predictive analytics, the gathering and analysis of data to predict future events, is as old as the information age itself, but few companies appreciate how predictive analysis can be adopted as a means to revise outdated business models.



At the beginning of the information age, whilst prediction could be made and assumptions drawn from the analysis of data, the process was invariably slow – partly due to not having developed the most efficient and appropriate tools, but mostly due to the lack of powerful computing capabilities.

Whilst predictive analysis has proved itself of value over the years, it was never cheap to implement. It is only recently that affordable, powerful, fast computers have become available to all. Utilising the power of the desktop, without the need to access the power of supercomputers now means that predictive analytics can be as close to you as the keyboard at your desk.

With the availability of powerful computers, industries across the board can now embrace predictive analysis as a way to revise outdated business models. 'It's the speed of real-time data being generated that makes it so appealing to businesses,' said Anindiya Ghose, Professor and Co-director of NYU's Stern Centre for Business Analytics.

The business analytics market has grown beyond simple credit reports to a market which is worth at least £20 billion in 2012, according to IDC Manufacturing. Now, predictive analytics is routinely used by legal firms to sort through case documents, by pharmaceutical companies to enhance sales, by health care firms to measure costs of health claims, by law enforcement to battle crime and by casinos to keep customers betting.

Predictive analytics grew to prominence in credit scoring whereby data models processing consumer credit history could predict with useful levels of accuracy, if the consumers under scrutiny were able to make future payments.

Predictive analytics have been in use to monitor equipment in real time to alert the operators of impending failure for many years. This is reducing losses due to unplanned down-time and improving safety at the same time.

What is new is how industries across the board are embracing predictive analysis as a way to revise outdated business models.

Speed of data assimilation and interpretation is also being utilised by companies to provide competitive advantage in the retail market. Macy's, the U.S. department store giant, used it to determine how many customers they would get at Thanksgiving recently, and predictive analytics allowed them to plan on what to sell in real time. Sears too, personalised retail promotions for customers in just a week by applying predictive analytics, their old business model used to take eight weeks!

Yodle, which provides online technology and marketing platforms for small businesses, found that predictive analytics provided them with a new way to evaluate which segments they should go after in the pursuit of new customers.

At the consumer level, email marketing has been described as a big predictive analytics employer. The top five responses to the question, 'What are the biggest email marketing challenges you expect to face in the next two years?' were:

- | | |
|--|-----|
| 1. Integrating email with other channels - | 57% |
| 2. Leveraging dynamic content - | 50% |
| 3. Leveraging segmentation - | 43% |
| 4. Managing email frequency and cadence | 38% |
| 5. Increasing open and click-through rates | 38% |

Email marketing effectiveness is a big data analytics problem because the core challenge with email is that multiple data sources have to be dealt with. Of these sources primary considerations are:

- How many emails went, to whom, what happened to them?
- What happened after someone clicked on your website's email links?
- Multi-channel customer purchase behaviour and customer lifetime value.
- Predicting Intent to Buy – Monthly, Daily, or even Hourly

Predictive analytics of such sources of data furnishes significant correlations to test markets and develop marketing campaign rules. Unfortunately, a typical campaign can consist of hundreds of rules to choose the right combination of content, channels and timing to maximise the effectiveness of marketing campaigns. Fortunately, analytics and predictive analytics can help to isolate which are the best rules to select.

The application of such analytics technologies now allow for creation and application of rules which can target 'nano-segments' of consumers (i.e. individuals) with marketing campaigns optimised by the month, week and in some cases, by the hour? Tesco in the UK uses real time data feedback to adjust their supply to stores. Being

able to change their delivery schedules in real time and target their consumers accordingly has imbued the company with real competitive advantage.

Machine learning can assist analytics as it can capture thousands of attributes of consumers including temporal and geo-spatial data which give analytics algorithms a better chance of predicting behaviour. There is a fundamental difference in the output from machine learning and traditional modelling though.

Machine learning models use self-learning systems that grow their intelligence over time and provide increasing prediction power. Traditional predictive models have a half-life and lose their predictive ability if they are not periodically refreshed. The ideal predictive model should therefore take advantage of traditional statistical techniques as well as information derived from 'big data'.

Machine learning, micro-segmentation and advanced analytics create new sets of possibilities for marketing managers who are looking at deriving improvements in value from their marketing channels.

<OR>

MORE MONEY FOR CHARITABLE PROJECTS

JO SMEDLEY, CHAIR OF EDUCATION & RESEARCH COMMITTEE

During 2012, the OR Society funded four educational, development and research projects to further the charitable aims of the Society.

Continuing this successful initiative, the Board are now calling for bids for more projects to further these aims, helping to take the Society forward and making an investment in the future. A total sum of £50000 will be available for such a project or projects.

Suitable project areas might include for example:

- Improving public awareness and understanding of O.R.
- Building productive links between O.R. and other professions
- Developing the contribution of O.R. to major national or global issues

Project proposals need to be submitted on the OR Society Charitable Projects template with each submission setting out background, aims and objectives, approach, personnel and their relevant experience, likely timescales and costs. A maximum of four pages per bid is expected. In assessing bids, particular emphasis will be given to:-

- The fit of the project with the Society's charitable aims;
- Its likely impact on our ability to achieve these aims in the future;
- The absence of alternative sources for funding.

Bids will be assessed by members of the Society's Education and Research Committee who will make recommendations to the Board on funded projects.

The aim is for projects to commence by the Autumn of 2013 at the latest.

Outline bids should be submitted to the Society's Secretary at gavin.blackett@theorsociety.com (using a standard form available from him on request) not later than Thursday February 28th 2013.

<OR>

O.R. AT BRITISH AIRWAYS: A LITTLE PRE-HISTORY

JOHN FRIEND

I was fascinated in our December issue to read Alistair Motion's piece on 60 years of O.R. at British Airways. For between 1956 and 1958 I worked at Heathrow in the O.R. group of BOAC, one of BA's two nationalised predecessors. We served the UK's intercontinental routes, while BEA served those within Europe.



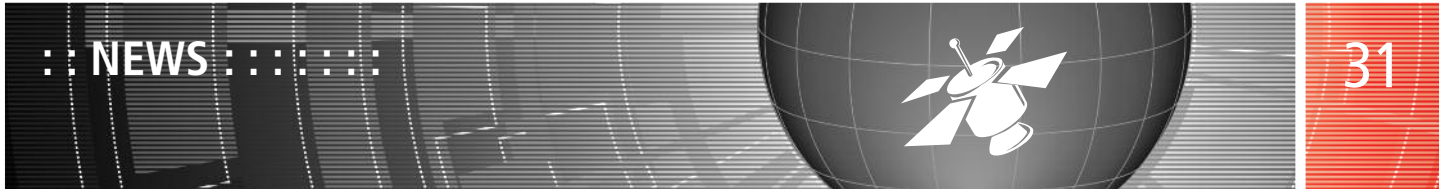
Cleveland O.R.

Both airlines employed quite large O.R. groups at that time. At the time I joined, BOAC had built up its O.R. service through the coming together at Heathrow of three separate 'operational analysis' sections responsible for analysing operational data for the three fleets of aircraft that had previously served different continents from separate airports in the south-east. Our new O.R. 'branch' at Heathrow brought together a dozen or so analysts - most of them engineers - alongside a large contingent of clerical staff who crunched operational data on punched cards in an open office under the watchful eyes of their mild-mannered supervisor, who went by the name of Mr. Boss.

We all worked together in what everybody knew as the Kremlin - a gaunt concrete building on the edge of the airport, a short walk from Hatton Cross tube station. This building had recently been

erected to house BOAC's new Comet fleet in four large corner hangars, linked by a cruciform multi-storey office block.

One day in 1957, we were visited by a contingent of eminent overseas scientists attending the first international O.R. conference in Oxford. Their programme included a day of optional visits to practising O.R. groups; and one party came to Heathrow to hear Alec Lee, Peter Longton and myself present case studies from BEA and BOAC. In BEA's presentation on passenger handling problems, the eminent visitors smiled indulgently when told of the difficulties of getting passengers to follow simple directions. There followed a visit to the central control tower, where the members of the party became widely scattered across levels when the time came for them to return to their coach. Even distinguished boffins, it appeared, can have human failings.



My own presentation that day, as I recall, was on one of two challenging projects on which I had been working – both concerned with queuing problems in provision of ground services, one at Heathrow and the other at Karachi. In these two apparently similar projects I found myself using contrasting methods; and I explored why in a paper subsequently published in the O.R. Quarterly (ORQ 9, 234-53, 1958). I was disappointed at the time not to have been invited to visit Karachi to see for myself the problems of servicing flights in transit there. It was not until 40 years later that I had my first opportunity to touch down in Karachi – at a newer successor airport – to deliver a short course in the strategic choice approach for the Pakistan Institute of Management.

While I was at BOAC, two other opportunities for intercontinental travel did however materialise. On the day of my interview at BOAC, I had also attended an interview at British Railways; and it was partly the more exotic flavour of BOAC's staff travel concessions that persuaded me not to hesitate in accepting their offer. The opportunity to fly on any of their routes at 10% of the normal fare, albeit on standby, first took me – newly married - to pre-independence Uganda for a spectacular eight-day adventure.

A later opportunity followed when BOAC sent me for a two week introductory course in O.R. to Cleveland, Ohio, run at the Case Institute by the fabled team of Churchman, Ackoff and Arnoff, whose classic introductory text had been published the previous year. In January 1958 the shores of Lake Erie were choked with ice. But who was I to grumble when the only alternative course those days was in Birmingham; and of course my airline employer could discount the additional travel costs. Once I had listened to the stirring words of Ackoff and Churchman, my ambition from then onwards was to develop my career as a true O.R. scientist, rather than as a mere mathematical statistician.

It was not to be long before I was to leave BOAC and move to a job as O.R. team leader in South Wales, becoming immersed in the affairs of SWORDS - the first of the Society's regional groups. For BOAC's O.R. group had steadily been haemorrhaging staff. I put this down in part to the baleful influence of the Finger Club, which I had been expected to join as soon as I arrived. Whenever I was called in to a meeting with our branch manager or his deputy, I could expect to see, through one or more of the glass partitions which separated our offices, the faces of a group of grinning colleagues waving our club's totem - a plaster replica of a gloved hand, which had originally featured in a Dunhill window display.

Then, should I be judged to have been too friendly with 'the management', an offence would be recorded in the Finger Club notebook and a fine of three (old) pence levied. When enough funds had accumulated, we would all go out for a festive lunch. On one occasion I recall that we occupied an overflowing box at an old-style music hall on the Edgware Road, treating the successive turns with scant respect. Our parody of the strife-ridden model of industrial relations that was then in wide currency may have been harmless juvenile fun. Yet behind this charade, I suspect, were the machinations of a colleague who was then active in the London youth wing of a national political party – I won't say which.

During my 30 months at BOAC, I suspect the Finger Club had a subtly corrosive effect on the morale and performance of our group. So I am delighted to see that in later decades the O.R. service of the merged British Airways has gone from strength to strength - realising the wider potential of O.R. to make a strategic contribution to the development of one of the world's major airlines.

<OR>

Letter to the Editor

JOHN HOPES ON FINANCIAL MODELLING

JIM BRYANT

I was interested to read John's Leader in the December 2012 issue of *Inside O.R.*

It reminded me of my earliest forays into the arena of financial modelling back in 1973.

At that time there was a very active user group around the ICL financial modelling software PROSPER, and a group of us in the North-West shared our experiences with meetings in Manchester. The point being that it was - as is so often the case in

O.R. - the software development process that provided the link between practitioners.

By the late 1970s we had run several short courses on the subject at the University of Sussex and it was part of our O.R. Masters course. Out of that came my book 'Financial Modelling in Corporate Management' (Wiley, 1982) but that's another story.

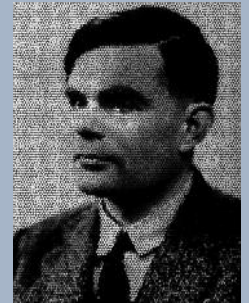
<OR>



COST OF INTOLERANCE WAS A LOSS TO THE NATION!

NIGEL CUMMINGS

2012 was the centenary of Alan Turing's birth, he was born on 23rd June 1912 and committed suicide on 7th June 1954.



Alan Turing lived for just 42 years. It has only been in recent years that the world has recognised his achievements after the veil of secrecy was lifted on the work that went on at Bletchley Park during WWII. Regrettably Turing did not live long enough to experience the explosion in computing technology that he helped to ignite. Though, from a life that lasted just 42 years his discoveries and inventions saved thousands of lives and paved the way for a better world. How much more would he have achieved if he had survived for longer?

We shall never know the answer to that question, but we do know Turing was one of the fathers of computer science and artificial intelligence, that his mathematics research in the 1930s led him to the concept of the Universal Turing Machine, an idea which predicted the ability of programmable computers to perform any task they were programmed to do.

Turing was enrolled at St Michael's, a day school in, St Leonards-on-Sea, at the age of six. The headmistress recognised his talent early on, as did many of his subsequent educators. In 1926, at the age of

13, he went on to Sherborne School, a well-known independent school in the market town of Sherborne in Dorset.

Turing's natural inclination toward mathematics and science did not earn him respect with some of the teachers at Sherborne, whose definition of education placed more emphasis on the classics. His headmaster wrote to his parents: 'If he is to stay at public school, he must aim at becoming educated. If he is to be solely a Scientific Specialist, he is wasting his time at a public school!'

Despite this, Turing continued to show remarkable ability in the studies he loved, solving advanced problems in 1927 without having even studied elementary calculus. In 1928, aged 16, he encountered Albert Einstein's work; grasped it fully and extrapolated Einstein's questioning of Newton's laws of motion from a text in which this was never made explicit.

After Sherborne, Turing studied as an undergraduate at King's College, Cambridge from 1931 to 1934, where he gained first-class honours in Mathematics. In 1935, at the age of 22, he was elected a fellow at King's on the strength of a dissertation in which he proved the central limit theorem, despite the fact that he had failed to find out that it had already been proved in 1922 by Jarl Waldemar Lindeberg.

In 1936 he published a paper on 'Computable Numbers and an Application to the Entscheidungsproblem' (decision problem) in which he outlined the 'Universal Machine', which later became known as the Turing Machine. This was an idealised computing device that was capable of performing any mathematical computation that could be represented as an algorithm.

From 1936-1938 Turing spent time at Princeton in the US studying under Alonzo Church. There he started to study cryptology as well as mathematics. In 1938 he received his PhD; his dissertation was called 'Systems of Logic Based on Ordinals' and introduced original logic and relative computing. Then in September 1938 he began working part-time at the Government Code and Cypher School.

On Monday 4th September 1939, the day after war was declared, he arrived at Bletchley Park. There he began work with Gordon Welchman to develop the Bombe, a device for decrypting messages sent by Germans using their Enigma machines. The Bombe built on a machine that the Polish had already made, called the Bomba Kryptologiczna.

He used statistical techniques to optimise the trial of different

possibilities in the code-breaking process using probability and quickly made a name for himself at Bletchley. Then in 1941 seemingly settled, he proposed to his co-worker Joan Clarke, a fellow mathematician and cryptanalyst. Shortly after though, he had second thoughts, and admitted to his fiancée that he was homosexual. This admission sowed the seeds of his eventual extinction.

Emotional issues aside, Turing was sent to the US in 1942 as part of intelligence collaboration. He shared what he knew about Enigma in return for being allowed to inspect the speech encryption system being set up to allow conversations between Churchill and Roosevelt. Turing was somewhat dismissive of US cryptanalysis, believing the Americans relied too heavily on machinery instead of thought.

A noted eccentric with a scruffy appearance and stammering speech - Turing's mother would have to write to him to remind him to buy 'at least one suit a year'. In Hut 8, where he conducted most of his code-breaking at Bletchley, Turing would attach his tea mug to the radiator using a combination lock. During hay fever season, it wasn't uncommon to see Turing ride his bicycle to work wearing his government-issued gas mask.

By 1943 Turing and colleagues had managed to break the more complicated German Naval Enigma system. This was invaluable to the Allies during the Battle of the Atlantic as it helped them route convoys to avoid the German U-boat wolf-packs, which had been responsible for sinking more than 700 Allied ships carrying 2.3 million tons of vital cargo.

In 1945 at the end of World War II, Turing was awarded an OBE for his services to his country and in October of the same year he joined the National Physical Laboratory (NPL) where he worked on developing an electronic digital stored-program computing machine that would later become the ACE (Automatic Computing Engine). By 1946 he had a finished proposal for the computer, but it was beyond its time and NPL did not have the resources to turn it into reality.

In 1947 he returned to Cambridge for a sabbatical year. (*The Pilot ACE was built in his absence and executed its first program on 10th May 1950.*) In 1949 he became deputy director of the Computing Laboratory at Manchester University, working on software for one of the earliest stored program computers — the Manchester Mark 1. He also explored problems associated with artificial intelligence and proposed an experiment that attempted to define a standard for machine intelligence, which would later become known as the 'Turing Test'. Artificial Intelligence could be claimed to have achieved parity with humans if during a double blind test, a human could not determine whether his or her questions were being answered by another human or a computer. (The humans would post their questions through a slit in a box. The printed answer would come back after a suitable delay the same way — sometimes there would be a human sat in the box, other times it would be a computer.)

Turing also worked with his former colleague D. G. Champernowne

on a chess program for a computer that did not exist yet. By 1952 and without a computer powerful enough to execute his chess program, Turing played a game in which he simulated the computer, taking about half an hour to perform each move. The program lost to Turing's colleague Alick Glennie, but won against Champernowne's wife.



In the same year he met Arnold Murray with whom he developed a friendship which Murray abused by burgling Turing's house. Turing made the fatal mistake of reporting the crime. In the ensuing enquiries he admitted to having a sexual relationship with Murray. Homosexual acts were illegal in the UK at that time and so both were charged with gross indecency. Turing was given the choice of being imprisoned or chemically castrated with oestrogen hormone injections. He chose the latter. If this was not bad enough, his security clearance was removed and hence he was barred from his cryptographic consultancy for the British government.

Chemical castration caused Turing to become acutely depressed and reclusive. On the 8th June 1954 Turing's cleaner found him dead. Turing had apparently poisoned himself using a cyanide-laced apple.

In 2012 Iain Lobban, Director of GCHQ in a speech given at Leeds University marking Turing's Centenary credited Alan Turing with 'bringing technology to the British Intelligence Service'. He also said the wartime mathematical genius would be solving today's computer security problems if he was alive today.

During his talk he pointed out that many of Turing's innovations were still directly being used by GCHQ. Mathematicians are still using the 'Turing ban', a unit of measurement originally devised by Turing and Jack Good to weigh the evidence for a hypothesis; standards for secure speech systems take the design of the voice encryption system devised by Turing as their starting point and GCHQ also continued using Bayesian statistics to score hypotheses, in the way first developed by Turing and his cryptanalytic colleagues at Bletchley.

Turing was a brilliant academic and he was credited by Winston Churchill as having made the single biggest contribution to the Allied victory in the war against Nazi Germany.

Alan Turing, mathematical genius, born June 1912 - died June 1954

SOCIETY AWARDS NEW COMPANIONSHIP

NIGEL CUMMINGS

The Companionship of Operational Research is awarded for sustained support and encouragement for the development of Operational Research or for those in influential positions who are in broad sympathy with the subject area. Such contributions might be through public or private activities.



Peter Millard and Geoff Royston

This year's recipient is Professor Peter Millard FRCP, Emeritus Professor of Geriatrics, St George's, University of London and President of the UK Nosokinetics Group.

Professor Millard coined the word nosokinetics in 1992 for his PhD thesis: it concerns flow rate modelling, a method of comparing performance in departments of geriatric medicine. Nosokinetics brings together the Greek words for noso: disease and kinetics: movement.

Black box models are currently used to plan changes in health and social care systems. These input-output models overlook the process of in-patient care; as a result sub-optimal decisions are made. Nosokinetics, analogous to pharmacokinetics, seeks to develop dynamic methods which measure and model the process of in-patient care. The aim is to develop a science base to underpin the planning of sustainable health and social care systems.

Professor Millard once wrote of Nosokinetics, 'If the random forces of wind and tide can make such a beautiful statue (referring to an iceberg), how much better could mankind do if a new science was developed which explains the complex processes of health and social care. Until new methods of planning health and social care services to meet the needs of an ageing population are introduced, service delivery will stumble on from crisis to crisis. The world population is ageing and sustainable systems of health care need to be developed.'

He has established the nosokinetics group of interested researchers. The group collaborates to organise conferences and disseminates

news of nosokinetics and other researchers' research and practical use of modelling to enhance decision making in health and social care systems. The Nosokinetics Group has succeeded in attracting a large number of researchers from many countries including Australia, UK & Egypt. They are from different disciplines ranging from health care providers to management scientists.

A past President of the British Geriatrics Society, he is, in active retirement, a Health Advisor to the National Pensioners Convention and co-supervisor of doctoral students modelling health care systems at the Universities of Ulster, Westminster and Adelaide. Professor Millard has authored over 120 publications on different aspects of modelling health and social care systems in addition to numerous publications in medical literature.

He was the first consultant in geriatric sciences appointed to St Georges Hospital and over a period of nearly twenty years he collected the unique longitudinal data set, including data on all geriatric patients in the hospital during that period – this has since proved an invaluable data and research source. With no background in mathematics or Operational Research, Professor Millard intuitively realised the need to analyse data and to understand the processes at work and to provide modelling and planning tools to furnish better services for the elderly.

This began a long collaboration between Professor Millard and a series of O.R. professionals which led to a series of publications and many Masters projects and PhD supervisions. He has also coordinated a large number of conferences and workshops both in the UK and abroad - most recently the 'Maths and Medicine Measuring and Modelling Patient Flow and Healthcare' event held in 2012.

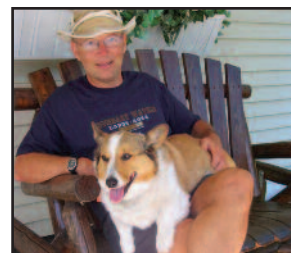
Professor Millard has previously been recognised by the medical community – in 1999 for example he became expert advisor to the council of Europe, and other honours include the 'President of the British Geriatric Society', and 'President of the Geriatrics and Gerontology section of the Royal Society of Medicine'.

Peter has been an outstanding champion for the cause of O.R. and healthcare for many decades, and it is timely and fitting, especially as he is a member of the O.R. Society and the Blakett Club that he should also be recognised by the Operational Research Community by the bestowing of the Companionship of Operational Research.

DO DOGS DO CALCULUS?

NIGEL CUMMINGS

Mathematician Tim Pennings recently pondered whether his 6-year-old Welsh corgi, Elvis, might actually know calculus because whenever he plays catch, Elvis instinctively finds the optimal path from one place to another even while traversing two different mediums involving variable speeds



Pennings and Elvis

Many dogs are 'pros' at catching balls and Frisbees. Would it be too much of a stretch to say it's their innate mathematical abilities that make them so good at catching that ball from mid-air? Not at all, according to mathematician Tim Pennings.

Dr. Pennings, an Associate Professor of Mathematics at Hope College in Holland, Mich., says that when a ball is thrown from the shore of Lake Michigan, Elvis always manages to find the quickest path, seeming to know that running speed is greater than swimming speed. This is a typical calculus problem involving finding the optimal path from one place to another while traversing two different mediums involving variable speeds.

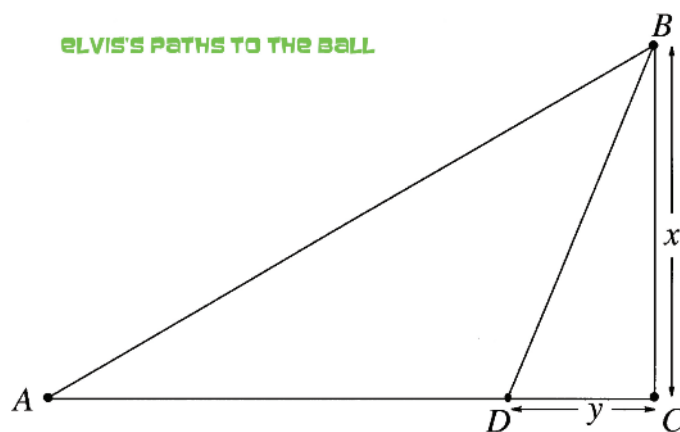
Most calculus students are familiar with the calculus problem of finding the optimal path from A to B. 'Optimal' may mean, for example, minimising the time of travel or minimising the distance travelled and typically the available paths must transverse two different mediums, involving different speeds.

When the ball is thrown, Elvis could choose from among three general options, Dr. Pennings says. He could hop into the water immediately and swim straight for the ball (the shortest route but slow because it involves swimming the greatest distance). Or he could run along the shore until opposite the ball and then swim after it, yielding the shortest amount of time in the water but involving more time running. Though his final choice is to run along the shore partway and then swim for the ball. With repeated trials, Mr. Pennings found that Elvis chose the third option every time.

'Standing on the water's edge (See Elvis's paths to the ball graph) at A, I throw the ball into the water to B. By the look in Elvis's eyes and his elevated excitement level, it seems clear that his objective is to retrieve it as quickly as possible rather than, say, to minimize his expenditure of energy. Thus I assume that he unconsciously attempts to find a path that minimises the retrieval.'

Dr. Pennings regularly takes Elvis with him to lectures where the calculus-clever dog is often used to demonstrate how nature often finds optimal solutions. Dr. Pennings thinks that using maths to model nature is an interesting process and maths sometimes tells things that we would not otherwise even guess at, 'thus, it's good to know math,' Dr. Pennings said at a recent lecture which began with Elvis demonstrating his intense desire to retrieve a ball. 'He also is involved at other points throughout the lecture. Otherwise, I try to keep him from stealing the attention. He loves it all. He is very

ELVIS'S PATHS TO THE BALL



Elvis's paths to the ball graph

much at home in colleges and universities.'

The pair were recently filmed in action for a program called 'What are animals thinking' which was shown on PBS. The popular dog also has appeared on BBC, NPR and FOX. 'Elvis and I have given the talk about 150 times,' Dr. Pennings said. 'Many of those are repeats at area high schools, but we have probably visited 20 to 30 institutions, including the University of Notre Dame, Duke, Boston University, and the University of Hawaii.'

Of course Elvis does not really know calculus. In fact, he has trouble differentiating even simple polynomials. More seriously, although he does not do the calculations, Elvis's behaviour is an example of the uncanny way in which nature often finds optimal solutions.

See:

For more information, google 'Elvis and Calculus? Dr. Pennings has published the data and maths behind his claims. See www.maa.org/features/elvisdog.pdf

Tim Pennings and Elvis can be contacted via email: pennings@hope.edu

OBITUARY ERNEST FIELD

NIGEL CUMMINGS

We are sad to announce the passing of Ernest Arthur Field, a long standing member of the OR Society.

Mr Field was awarded a BSc (Honours II, in mathematics and chemistry) at Sheffield University in 1949. In 1950 he became a Fellow of the Royal Statistical Society. He applied his mathematics and chemistry qualification to the oil industry becoming well known for numerous works at Imperial Chemical Industries from 1949 until 1951 and ESSO Research from 1955 until 1962.



Whilst working for Esso he was in charge of the mathematical group and later became coordinator of the O.R. group there. These groups were responsible for long and short range economic studies, optimum utilisation of man-power and research facilities, technical computation and research on Esso's marine terminal facilities.

It could be said that his interest in O.R. grew as a result of the numerous O.R. like projects he was involved with during his time at Esso, though it took a while for him to find time to return to academia as an O.R. student. After a period of study at Birmingham University in the late 1950's he achieved an MSc in O.R. which was awarded in 1960.

His thesis concerned marine technical design and the development of discrete time queuing using Markov process theory. Around this time he became an associate member of our society and in 1962 applied for full membership - this was granted and 2012 signified a fifty year involvement with the O.R. society. Mr Field applied his O.R. skills from 1961 onward to the co-ordination and development of new O.R. techniques particularly in the development of mathematical and logical analysis and location problems at Esso.

During the 1960s and 1970s he became a familiar figure at O.R. functions and was notable for his efforts to highlight the importance of cementing theoretical O.R. to its practical applications. In the late 1960s he was appointed Manager at Esso's Marketing O.R. unit, with the initial assignment of modelling the company's immensely complicated product distribution system as an efficient approach to rationalisation and cost reduction.

As a manager at Esso, Ernest emphasised his belief that good O.R. could only be done by good O.R. people and accordingly set his recruitment sights at the very highest level. He also realised that with marketing being a softer technology than refining and oil production, it was necessary to take a broader view of O.R.'s contribution to the decision-making process.

Accordingly he began to work more closely with online computing and market research. His unit produced the very first online decision support system used by the company to increase the effective utilisation of Esso's coastal tanker fleet. From 1970 onwards he was manager of the logistics planning O.R. unit at Esso; the function of the unit was to provide O.R. to marketing, refining and transportation. He then became from 1975 until 1980 manager of the systems development division at Esso, where his interest in systems and their link with O.R. was further stimulated.

At this time, O.R. methodologies were in the process of integration to larger Management Information Systems, drawing data from many of Esso's terminals and refineries throughout Europe. He emphasised the importance of possessing an aptitude for computer languages for his O.R. staff, this he thought was essential to allow them to maximise their contribution and thus survive as O.R. practitioners within the organisation.

Although he did not realise it then, he was preparing his analysts to assume important and influential positions within a new era of microprocessors and end user computing. From the 1980s onward he presented papers at various O.R. events. These papers concerned the development of management information and office technology systems, two subjects which interested him greatly.

The last few years of his work at Esso were involved primarily with consultation, and he retired in 1983 to become a senior industrial adviser to the Monopolies and Mergers Commission. Despite the pressures of work as adviser to the Commission, Ernest managed to find the time to be Chairman of LASEORS, the Society's Treasurer and to serve on Council and as a member of the General Purposes Committee (GPC). He was also a member of the executive committee which managed EURO activities on behalf of the Council of EURO before joining the Council of EURO.

Ernest Arthur Field – 1924 -2012

ESRC HAS THE NATION IN FOCUS: BRITAIN IN 2013

NIGEL CUMMINGS

Published on 19 November, *Britain in 2013 - The Nation in Focus*, showcases the diversity of research funded by ESRC, the Economic and Social Research Council.

Britain in 2013 is a mixture of academic opinion pieces alongside informed journalistic writing, offering a concise analysis of research and topical issues concerning Britain today. It reflects on, and offers possible solutions to, the most pressing problems British society faces.

This year's magazine features an article by Professor Nicholas Stern who makes the case for Britain increasing the speed of its response to climate change, and Professor Carol Proper examines hospital mergers. Professor Simon Burgess looks at the effectiveness of Ofsted's inspection system and Britain's retail sector comes under the focus of Neil Wrigley and Michelle Lowe.

The magazine also carries an article by Economics expert Romesh Vaitilingam which takes a retrospective view of British achievements and asks whether lessons from our past can help Britain's economy grow in our future.

Paul Johnson, Director of the Institute for Fiscal Studies, considers the tough choices Britain faces and the fiscal adjustments needed to create a secure future for all, and with a referendum on Scottish independence confirmed for 2014, ESRC experts on politics and devolution offer their views on the possible outcomes for the people of England and Scotland.

According to Paul Boyle, Chief Executive of the ESRC, 'The publication of *Britain in 2013* could not come at a better time. As a nation we have enjoyed a year of highs and lows, from embracing moments of sporting joy to dealing with the global recession and how to stimulate growth. The research findings we have included

from across the social science community show that now, more than ever, economic and social science research has a fundamental impact on almost every aspect of our society.'

ESRC funds research across this wide range of issues and contributes to greater knowledge and understanding of the many challenges our society faces. But, importantly, much of this research goes further, to propose solutions and show where interventions have a positive effect. Many examples of these important contributions are gathered in *Britain in 2013*.

Britain in 2013 also carries feature material which illustrates how scientists assess how well advances in science change the way we think about ourselves and create difficult ethical issues for clinicians, and social science experts revisit the social mobility enigma and ask: if politicians from all parties agree that British society is unequal, why is it proving so hard to change?

Britain in 2013 showcases the diversity of ESRC-funded research around the state of the nation in 2012. It will appeal to those who enjoy debate and current affairs and have an interest both in social sciences and UK society. It is available widely, priced at just £5.50. Alternatively you can order a copy by emailing Azone at sales@azonelogistics.co.uk.

All profit made from the sale of the magazine is reinvested in research communication. More information on how the Economic and Social Research Council is helping to shape society can be found at: <http://www.esrc.ac.uk/>

<OR>

NEWS OF MEMBERS

The Society welcomes the following new members,
MESAR AL-ALI, Middlesex; JAMES CRILLY, Hertfordshire;

and Reinstated members,

and the following student members,

Total Membership
2350

NEW ACCREDITEES

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

Admit to the category of Associate (AORS)

Simon PORTER

Admit to the category of Fellow (FORS)

James CROSBIE

<OR>

START YOUR PREPARATIONS FOR OR55 – EXETER

3-5 SEPTEMBER 2013

DAVID SMITH, JOINT CONFERENCE CHAIR

The next OR Society conference, OR55, will take place from 3-5 September on the campus of the University of Exeter. In the coming months, there will be the usual calls for papers, news of the programme and so on.

But it's never too early to start swatting for the famous OR Society bar quiz. So here are 55 things about Exeter – some or none of which may be the subject of bar quiz questions – but a few will, we hope, encourage you to come to the south-west next September.



- 1 Exeter is on the River Exe, and its Latin name of Isca comes from Celtic 'River full of fish'
- 2 Parts of the Roman walls of Exeter can still be seen
- 3 There are three places with the name Exeter in Australia, one in Canada, and over a dozen in the USA
- 4 Exeter has a patron saint, Sidwella, a Christian woman who was martyred
- 5 A survey in 2005 rated Exeter as the worst example of a clone town in the UK, with only a single independent store in the city's high street
- 6 Exeter Canal is the oldest canal in the country with pound locks
- 7 The creator of Harry Potter, J K Rowling, is a graduate of Exeter University
- 8 The underground passages which supplied drinking water in medieval times are open to the public
- 9 At 64cms wide, Exeter's Parliament Street is one of the narrowest streets in the world

- 10 OR55 has two co-chairs; one taught the other at Exeter University.
- 11 The Royal Navy has named five ships HMS Exeter
- 12 In 2012, Exeter's Royal Albert Memorial Museum was Britain's Museum of the Year
- 13 In the same year, the University of Exeter was University of the Year
- 14 Exeter College, Oxford, was founded in 1314 by the then Bishop of Exeter
- 15 Exeter's Guildhall is the oldest civic building in the UK still in use
- 16 In 1816 the Exeter Mailcoach was attacked by a lion
- 17 The TV programme 'The Onedin Line' was filmed on Exeter's Quay
- 18 Exeter Cathedral (below) has the longest uninterrupted medieval vaulted ceiling in the world



- 19 Peregrine falcons nest on the spire of St Michael's church
- 20 The population of Exeter is approximately 120,000
- 21 In 1961, a Tudor house weighing 21 tons was moved to make way for road improvements.
- 22 The Baring family, founders of the bank, came from Exeter.

- 23 The city's motto is 'Semper Fidelis'
- 24 The Royal Clarence Hotel was the first establishment in England to be called a 'hotel'
- 25 The USS Exeter was a starship in an episode of Star Trek
- 26 The Met Office relocated from Bracknell to Exeter in 2003
- 27 The Exeter Oak is a cross between a Turkey Oak and a Cork Oak, first grown in Exeter.
- 28 Magnolia 'Isca' is a cross between Campbell's magnolia and the Yulan magnolia
- 29 In 1887, 160 people died in a fire at the Theatre Royal, leading to changes in the laws for all British theatres
- 30 Exeter University was, originally, a college giving University of London degrees
- 31 When the tower of Exeter's hospital was demolished, O.R. staff from Exeter University helped schedule the move of wards and theatres
- 32 The Marquess of Exeter lives in Lincolnshire
- 33 The last OR Society conference to be held in Exeter was OR33 in 1991
- 34 A medieval craftsman carved an elephant in the cathedral choir, the oldest picture of the animal in England
- 35 Exeter City Football Club is known as 'The Grecians'
- 36 They play at St James' Park (not that one!)
- 37 Exeter Chiefs play rugby in the Aviva Premiership
- 38 Nearly 70% of Exeter's city walls are still visible
- 39 Thomas Bodley, founder of Oxford's Bodleian Library, was born in Exeter
- 40 Northernhay Gardens is the oldest public open space in England
- 41 Concorde has landed on and taken off from the long runway of Exeter International Airport
- 42 In 1942, Exeter was bombed in one of the Baedeker raids, and over 150 people were killed
- 43 Troops trained for the D-Day attack on Pegasus Bridge with simulated attacks on Exeter Canal Bridge
- 44 The Bristol and Exeter Railway from Paddington reached Exeter in 1844
- 45 Sixteen years later, the London and South-Western line reached the city
- 46 Exeter is still connected to two London termini, Paddington and Waterloo
- 47 The ascent from Exeter St David's to Exeter Central is the steepest on a main line in England
- 48 Charles Dickens visited Exeter and based his character 'The Fat Boy' on an Exonian
- 49 In the High Street, the statue commemorating 'The Year of the Pedestrian' shows a group of people without any legs.
- 50 *The Exeter Book* is a 10th century collection of Anglo-Saxon verse, including over 90 riddles
- 51 It is not to be confused with the *Exeter Doomsday*, a book containing information about Devon and Cornwall collected in the Doomsday Survey of 1086
- 52 Until the 1970s, Exeter was a bottleneck for holidaymakers going to Cornwall, despite having a bypass
- 53 St Peter's Cathedral in Exeter has a naked statue of St Peter on its west front
- 54 The Roman Baths in Exeter date from about 54 or 55 AD
- 55 OR55 will be a splendid conference

<OR>



January – March 2013

ORO2013 Second international conference on Operations Research and Optimization

19-22 January 2013, Tehran, Iran. <http://math.ipm.ac.ir/conferences/2013/ORO2013/>

ASTEC'2013 4th Annual Asian Simulation Technology Conference 2013

7-9 March 2013, Shanghai, China P.R. www.eurosis.org

GAMEON-ASIA'2013 5th annual Asian GAME-ON Conference

7-9 March 2013, Shanghai, China www.eurosis.org

EMO 2013 - the 7th International Conference on Evolutionary Multi-Criterion Optimization

19-22 March, 2013, Sheffield, UK, www.shef.ac.uk/emo2013

IMCIC2013 - 4th International Multi-Conference on Complexity, Informatics and Cybernetics

19-22 March 2013 Orlando, Florida, USA <http://www.2013iiisconferences.org/imcic>,

KGCM2013 The 7th International Conference on Knowledge Generation, communication, and Management

19-22 March 2013, Orlando, Florida, USA www.2013iiisconferences.org/kgcm

7TH IMA Quantitative Modelling in the management of health and Social Care Conference

25-27 March 2013, London, UK <http://www.ima.org.uk/conferences/health2013.cfm>

April – June 2013

EVO2013, 16th European Conference EuroGP, EvoCOP, EvoBIO, EvoMUSART and EvoApplications

3-5 April 2013, Vienna, Austria www.evostar.org

YOR18, Young OR18 Bi-annual Conference for O.R careers of less than 10 years

9-11 April 2013, University of Exeter, UK <http://www.theorsociety.com/Pages/Conferences/YOR18/YOR18.aspx>

FUBUTEC'2013 9th Annual Future Business Technology Conference 2013

15– 17 April 2013, LIncoln, , UK <http://www.eurosis.org/cms/?q=node/2281>

ICMSAO'13 5th International Conference on Modeling, Simulation and Applied Optimization

28-30 April 2013, Hammamet, Tunisia www.icmsao.org

ISORAP 2013 International Symposium on Operational Research and its Applications

8-10 May 2013, Marrakech, Morocco <http://isorap.uiz.ac.ma/>

ISCRAM2013: The 10th International Conference on Information Systems for Crisis Response and Management

12-15 May 2013, Baden-Baden, Germany <http://iscram2013.org>

IIE 62nd Annual Conference & Expo

18-22 May 2013 San Juan, Puerto Rico <http://www.iienet2.org/annual2/>

ISC'2013 11th Annual Industrial Simulation Conference 2013

22-24 May 2013, Ghent, Belgium <http://www.eurosis.org/cms/?q=taxonomy/term/334>

CIAC 2013 8th International Conference on Algorithms and Complexity

22-24 May 2013 Barcelona, Spain <http://albcom.lsi.upc.edu/ciac2013>

KIM2013 Knowledge and Information Management conference

4-5 June 2013 Meriden, UK www.theorsociety.com//KIM2013.aspx

MathSport 2013 – The 4th International Conference on Mathematics and Sport

5-7 June 2013 Leuven, Belgium <http://www.mathsportinternational.com>

ICAPS'13 The 23rd International Conference on Automated Planning and Scheduling

10-14 June 2013 Rome, Italy <http://icaps-conference.org>

MCDM2013 22nd International Conference on Multiple Criteria Decision Making

17-21 June 2013 Málaga, Spain <http://www.mcdm2013.decytec.ccee.uma.es/index.php>

MIM 2013 IFAC Conference on Manufacturing Modelling, Management and Control

19-21 June 2013 Saint Petersburg, Russia <http://www.mim2013.org/>

DEA2013 11th International Conference on Data Envelopment Analysis

27-30 June 2013 Samsun, Turkey <http://DEAsociety.org/dea2013>

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

July – September 2013

Euro XXVI and INFORMS Joint Conference

1-4 July 2013 Rome, Italy <http://euro2013.org/>

IMSIO 5 2013 The 5th European Conference on intelligent Management Systems in Operations

3-4 July 2013, University of Salford, UK email s.vadera@salford.ac.uk

GECCO 2013 GENETIC AND EVOLUTIONARY COMPUTATION CONFERENCE

6-10 July 2013, Amsterdam, The Netherlands <http://www.sigevo.org/gecco-2013>

EISTA 2013 The 11th International Conference on Education and Information Systems, Technologies and Applications

9-12 July 2013 Orlando, Florida, USA www.2013iisconferences.org/eista

IMSCI 2013 The 7th International Multi-Conference on Society, Cybernetics and Informatics

9-12 July 2013 Orlando, Florida, USA www.2013iisconferences.org/imsci

MISTA 2013 Special Track on EDUCATIONAL TIMETABLING

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

OR55 Operational Research Annual Conference

3-5 September 2012 Exeter, UK <http://www.theorsociety.com/pages/conferences/conferences.aspx>

International Conference on Operations Research

3-6 September 2013, Rotterdam, The Netherlands, www.or2013.org

CONFERENCE NEWS

EVENT: YoungOR18 Conference	DATE: 9 – 11 April 2013	VENUE: University of Exeter
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EVENT: KIM2013 Conference	DATE: 4 – 5 June 2013	VENUE: Forest of Arden Hotel, nr Coventry
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EVENT: IMS105 2013	DATE: 3 - 4 July 2013	VENUE: University of Salford
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EVENT: OR55 Annual Conference	DATE: 3 – 5 September 2013	VENUE: University of Exeter
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REGIONAL SOCIETIES

EAST MIDLANDS (EMORG)

CONTACT: Chris Smith

TEL: 01530 416426

EMAIL: chrissmith677@gmail.com

EMORG - Learning OR on the job: recent experience in the local NHS

Date/Time: Wednesday, 23 January 2013 at 18:00

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

Speakers: David Gilding

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

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

EMORG - Annual General Meeting

Date/Time: Wednesday, 23 January 2013 at 20.00

Venue: Burleigh Court, Loughborough University

Abstract: The EMORG Annual General Meeting will follow the talk on 'Learning O.R. on the job: recent experience in the local NHS'. We will move from the Business School to 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)

EMORG - Sports Analytics

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

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

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

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

LONDON & SOUTH EAST (LASE OR S)

Programme 2012

Location (unless otherwise specified): In the upstairs bar of Ye Olde Watling, on the Corner of Bow Lane and Watling Street nearest stations are Mansion House (Bow Lane exit) and Bank (exit 8) for tube, or Cannon Street and City Thameslink for rail. The event is open to all and with a free buffet of sandwiches available afterwards.

FOR FURTHER DETAILS CONTACT:

Sandra Weddell

TEL: 020 7918 4591,

EMAIL: Sandra.Weddell@tube.tfl.gov.uk

or Martin Caunt

TEL: 020 7215 3317,

EMAIL: Martin.Caunt@dti.gsi.gov.uk

LASEORS - Forecasting demand for London 2012 and what really happened

Date/Time: Tuesday, 15 January 2013 – Start 18.00

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.

Speaker: Neil Richard of Transport Modelling, London Underground

Abstract: A presentation on the demand forecasts developed for the London 2012 Olympics and Paralympics. This process covered the London Underground, London Overground and Dockland Light Railway networks, bringing together multiple data sources to represent the overall transport system. With the Games now over, the presentation will also focus on the rare opportunity to use actual data to review the accuracy of a complex forecasting process, and thus highlight lessons to be learned.

The event is open to all and with a free buffet of sandwiches available afterwards.

NOTICEBOARD

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For further details contact:

Sandra Weddell Tel: 020 7918 4591,

Email: Sandra.Weddell@tube.tfl.gov.uk

or Martin Caunt Email: martin.caunt@dh.gsi.gov.uk

MIDLAND (MORS)

CONTACT: Jen East (Secretary)

EMAIL: MidlandsORSociety@live.co.uk

NORTH WEST (NWORDG)

CONTACT: Nathan Proudlove

EMAIL: nathan.proudlove@mbs.ac.uk

SCOTLAND (ORGS)

CONTACT: Kerem Akartunali (Chair)

EMAIL: Kerem.Akartunali@Strath.ac.uk

CONTACT: Roberto Rossi (Secretary)

EMAIL: roberto.rossi@ed.ac.uk

SOUTHERN OR GROUP (SORG)

CONTACT: Patrick Beullens

TEL: 023 9284 6357

EMAIL: p.beullens@soton.ac.uk

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.

TEL: 029 2087 5524 Fax: 029 2087 4199

EMAIL: ThompsonJMI@cardiff.ac.uk

SWORDS - O.R. in sport: some examples

Date/Time: Tuesday, 26 February 2013 at 17.45

Venue: TBC

Speaker: Phil Scarf

This talk considers how modelling can be used to shed light on a variety of sporting problems. We look at:

1. How the timing of a declaration in the third innings in test match cricket can be 'optimized'.
2. Route choice in mountain running events and an empirical basis for Naismith's rule.
3. Rating football players based upon actions that contribute to the final result of the game.
4. How we might rank players in test cricket putting batting and bowling contributions on the same scale.

5. Optimum strategy in match sprint track cycling.

6. Tournament design.

Not necessarily in this order and with more or less detail depending on how it goes...

Phil Scarf is a professor at the University of Salford. His research interests are in Replacement Modelling, Reliability and Maintenance Modelling, and O.R. and Statistics in Sport. He is currently co-editor of the IMA Journal of Management Mathematics which recently published a special issue on O.R. in Sport under his editorship. He has competed in a variety of sports: rugby, cricket, rowing, orienteering, cycling. His current hobby is expedition racing.

Dates for your Diary

Wednesday 12th December 5.30pm, Cardiff University – Professor Jeff Griffiths. The Heathrow Queuing Problem

Wednesday 20th February 3.30pm – Trip to the Royal Mint

Tuesday 26th February 5.30pm Cardiff University – Professor Phil Scarf, O.R. in Sport: Some Examples

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

WESTERN (WORDS)

CONTACT: Dr Jo Smedley

TEL: 01633 432573

EMAIL: jo.smedley@newport.ac.uk

The WORDS/IMA - Is 42 the real answer?

Date/Time: Wednesday January 23rd 2013

Venue: University of the West of England (Frenchay Campus), Bristol.

Speakers: Dr John Crocker

Abstract: Simulation, whether Monte Carlo (MCS), discrete-event (DES) or agent-based (ABS), can be a very powerful and often useful tool but it is not reality. This is especially true when used in conjunction with optimization methods. We shall look at some of the ways the results of a simulation model can lull you into a false sense of security, so to speak.

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: Stuart Johns.

TEL: (0114) 225 3136

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

SPECIAL INTEREST GROUPS

COMMUNITY OR NETWORK

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

COMPLEX SYSTEMS DISCUSSION GROUP

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

CRIMINAL JUSTICE

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

Dates for your Diary:
 Criminal Justice Special Interest Group Meeting
Date/Time: Monday, 04 March 2013
Venue: W. Yorks Police, Wakefield
Speaker: TBC

Details to be notified at the end of 2012.

DECISION ANALYSIS

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

DEFENCE

CONTACT: Noel Corrigan
EMAIL: noel.corrigan@corda.co.uk
ACTING CHAIR:
 Alan Robinson
 Chief Scientist
 PCS Dept,
 Defence Science and Technology Laboratory (Dstl)
 Portsmouth West, Portsmouth Hill Road,
 Hampshire, PO17 6AD
TEL: 02392 53 2839
EMAIL: arobinson@dstl.gov.uk

FINANCIAL SERVICES

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

FORECASTING

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

HEALTH & SOCIAL SERVICES

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

Quantitative Modelling in the Management of Health and Social Care Conference

Date/Time: Monday 25 March 2013
Speakers: See below
Venue: Woburn House Conference Centre, London

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

: : NOTICEBOARD : : : : : : : :

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Confirmed Invited Speakers

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

We invite researchers in all relevant problem domains and methodologies to submit abstracts of 300 words by Friday 14th December 2012 by e-mail to conferences@ima.org.uk.

For more information visit

www.healthcareanalytics.co.uk/conferences/imahealth2013/

INDEPENDENT CONSULTANTS NETWORK

CONTACT: Hadley Hunter, Chair

TEL 020 8202 9279

EMAIL: hadley@hadleyhunter.co.uk

SUPPORTED BY: Colin Elwood

TEL 01372 450022

EMAIL: crelwood@dweomer.co.uk

INFORMATION SYSTEMS

CONTACT:

TEL

EMAIL: email@theorsociety.com

LOCAL SEARCH

CONTACT: Said Salhi (chair)

TEL: 01227 824672

EMAIL: s.salhi@kent.ac.uk

CONTACT: Rong Qu (secretary)

TEL: 0115 846 6503

EMAIL: rxq@cs.nott.ac.uk

MATHEMATICAL PROGRAMMING

CONTACT: Katarina Papadaki, London School of Economics

EMAIL: k.p.papadaki@lse.ac.uk or

CONTACT: Giacomo Zambelli

EMAIL: g.zambelli@lse.ac.uk

TEL: 0207 955 7693

O.R. AND STRATEGY

CONTACT: Frances O'Brien

TEL: 02476 522095

EMAIL: Frances.O'Brien@wbs.ac.uk

O.R. FOR DEVELOPING COUNTRIES

CONTACT: Eric Soubeiga

TEL: 020 8659 3265

EMAIL: eric.soubeiga@hotmail.co.uk or
eric.soubeiga@orpagroup.net

O.R. IN THE THIRD SECTOR

CONTACT: Katherine Byrne

EMAIL: katherine.byrne@voa.gsi.gov.uk

PROBLEM STRUCTURING METHODS

CONTACT: Giles Hindle (Chair)

TEL: 01482 463457

EMAIL: giles.hindle@hull.ac.uk

or **CONTACT:** Dr. L Alberto Franco, University of Warwick

TEL: 024 7652 4391

EMAIL: alberto.franco@wbs.ac.uk

PRODUCTIVITY MEASUREMENT

CONTACT: Ozren Despic

EMAIL: o.despic@aston.ac.uk

SD+ (SYSTEM DYNAMICS)

CONTACT: David Lane (Chair)

TEL: 0207 955 7336

EMAIL: d.c.lane@henley.ac.uk

or **CONTACT:** Sally Brailsford (Secretary)

TEL: 023 8059 3567

EMAIL: s.c.brailsford@soton.ac.uk

SIMULATION

CONTACT: Christine Currie

TEL: 0238 059 3647

FAX: 0238 059 5147

EMAIL: christine.currie@soton.ac.uk

or **CONTACT:** Katy Hoad

EMAIL: Kathryn.hoad@wbs.ac.uk

OR-30

January 1983 (John Crocker)

Most months, my decision regarding which papers to include and which to exclude is largely made for me. Firstly, I download each of the papers from the archive. Just over four years ago my wife decided it was time I cleared out all my junk from the loft and my set of 400 issues of *JORS* (and *ORQ*) was one of these items so it was no great surprise that shortly after I was persuaded to take over this column but I digress. As I download them, I read the titles and the abstracts. Any that I think I understand, I move to a file called 'possibles'. I then go back through them all again to see if there is at least one that I can write about! This month was very strange as my 'possibles' file contained all eleven papers. After forty years of calling myself an O.R. person, have I at last reached a stage in life when I can say that I understand something about the theory of the subject, surely not. A much more plausible explanation must be that Peter Amiry, the then editor of *JORS*, was starting to have an influence on the type of papers being accepted.

Having wasted half of my allotted space with irrelevant twaddle, there is now nowhere nearly enough space to give justice to all eleven papers so I will take the easy option and write a little bit about Harold Larnder (1902-1981). The first paper was in fact 'an appreciation' by Ronald G. Stansfield entitled *Harold Larnder Founder of Operational Research*.

One of the first tasks Larnder and his colleague Eric C. Williams was given on 15th May 1940, was to persuade Churchill not to send a further ten fighter squadrons to France. At the time, he was in charge of a group of civilian scientists at the Stanmore Research Section (later to be renamed the Operational Research Section, Fighter Command). Sir Hugh Dowding, C-in-C, Fighter Command believed sending more fighters to France would leave the UK too weak to defend herself. He was due to leave in two hours to attend a meeting of the War Cabinet. Remember in those days the only computers were invariably young ladies sat at desks with pencil,

paper and if they were very lucky, a mechanical adding machine. There was also no internet, fax machines, photocopiers or graph plotters. Between them, Williams got out the numbers and Larnder converted them into a graph showing fighter wastage and replacement. The next day, Dowding reported back that they had done the trick. The 'quick and dirty' solution for which O.R. groups were to become [in]famous was born! Dowding's PA later recorded, 'there seems little doubt that, had Dowding not won his battle with Churchill in May, he would almost certainly have lost the Battle of Britain in September.'

Stansfield makes the observation that Larnder was head of the Operational Research Section at Fighter Command when the RAF won the Battle of Britain and of the corresponding Section at Coastal Command in 1943 when the RAF won the Battle of the Atlantic – a remarkable record. Incidentally, the first head of the O.R. Section at Coastal Command was Professor P.M.S. Blackett whose memorial lecture I attended the evening before writing this article given by Professor David MacKay and reported elsewhere in this issue.

Larnder, like Tizard, was a leader who was able to get those intellectually superior to him to work together happily. He had the gift to sense what would be required of his group in six months time and be ready for it. And, he got on well with the officers of all ranks and was able to gain their confidence because he was able to talk their language and was not afraid to get his hands dirty or put himself at risk when necessary.

(Apologies to the authors of the other ten papers which I have not covered.)

Stansfield, Ronald G. (1983), *Harold Larnder Founder of Operational Research*, *JORS* 34.1, Pp 1-7, (jors19831a.pdf)

<OR>

OR-20 Extracted from OR Newsletter January 1993

Marketing O.R. services

Heads of O.R. event on 30 November

The objectives of this event were firstly to explain the basic concepts of marketing, particularly the marketing of services, and secondly to explore how to translate these concepts into a practical plan for marketing Internal O.R. Services. The event attracted a diverse audience from both public and private sector O.R. groups. Notably there was also a fair sprinkling of academics – evidence of the harsh realities of a world where students are customers and outside consultancy is a vital source of income.

The chairman, Vince Hopkinson (British Gas), introduced the event by explaining that it was being held as a result of market research which HORG had carried out amongst members, and was one of a planned series of related events.

The first speaker was David Adams from PA Consulting Group. He explained marketing as a pyramid, with objectives at the apex, widening out to segmentation, positioning and finally functional strategies at the base. Two important messages were the danger of plunging in at the operational level before the higher level have been considered, and the need to assemble very detailed

information about the views and preferences of different market segments – it is almost impossible to be too detailed. He dwelt too on the key difference between important and determinant factors in marketing. All important factors right – the determinant factors are those which distinguish one supplier from another and thus decide who gets the business.

Jim Parish of OASIS Group developed these ideas, explaining how to go about producing a marketing plan. He echoed the message about starting with clear marketing objectives, and added that these must always be both measurable and achievable. Turning to the price of using O.R., he mentioned time, uncertainty and the need to change as perceived costs to the customer, and stressed the importance of anticipating resistance to change. He also emphasised the value of an influential 'executive champion' for the service in terms which customers will understand. To illustrate this he quoted answers he had received within OASIS to the question 'What is O.R.?'. These ranged from the OR Society definition through 'queuing theory' to 'um...'.

The talks provoked some lively discussion, focused on how to apply the messages to an internal O.R. Service. Recurring themes included who our competitors are (not just external consultants, but also customers' DIY or other internal services like IT), the best way to carry out internal market research, and the perennial problem of explaining what O.R. can do – an issue which is linked to the recent discussions about a 'core message' for O.R.

After lunch the organisers no doubt thought it was time for us to do some work ourselves. James Gibb (Shell International Petroleum) divided us into syndicate groups, with the task of producing and presenting an action plan for marketing one member's O.R. group. This provided an incidental exercise in decision analysis: how to choose the guinea pig. As it turned out we had presentations on marketing O.R. in the MET. Police, Royal Mail and British Airways. It was striking that these groups all face similar marketing problems despite their different business environments, and the proposed action plans also had many common threads. The problem of 'getting into' high profile work when the group is already heavily loaded with more routine work featured in all the presentations.

All in all this was a useful day, not least for the opportunity to compare notes with others and for the reassurance that they are grappling with similar marketing problems. I came away with some clear ideas about how to tackle marketing. Now it's up to me to put my good intentions into practice.

One delegate suggested that the OR Society should hold a workshop for members to exchange experiences of developing their marketing plans. We will be pleased to do so if there is sufficient support please let Neville House know if you want such an event.

By Sue Rice

<OR>

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IMPORTANT: Contributors please note. All contributions must be in four parts as follows (1) headline (approx 6 words); (2) mini-abstract (max 25 words); (3) main body of contribution (max 500 words); (4) keywords. At the editor's discretion, contributions exceeding 500 words will be shortened, serialised or published with the warning Long article. X words. Whenever possible contributions should be submitted electronically as Word files and emailed to insideor@theorsociety.com. 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.



SIMULATION CONSULTANCY en FRANÇAIS
To c£45,000 + Bonus

Our client provides simulation-enabled business transformation solutions for a worldwide client base. They now seek an accomplished consultant with experience of dynamic simulation, optimisation and advanced spreadsheet modelling...plus fluency en Français...to take up a newly created role, either based in Paris or the UK. This is an enviable opportunity to join a great team environment, where individual achievement is both supported and rewarded.

Paris, Midlands or UK Home based

MODELLING & PROGRAMMING
£30,000 - £50,000 + Bonus

Our consultancy client, recognised as an innovative leader in the field of simulation and optimisation, seeks a top calibre professional to contribute to their continuing growth. The successful candidate will need a demonstrable modelling track record to date, including proven programming experience, together with well developed communication and client interaction skills, underpinned by a 1st or 2i degree in a numerate subject.

M3 Corridor - Surrey/Hants

MODELLING & ANALYTICS – AUSTRALIA
\$80k- \$145k Packages + Relocation

Our client, a global professional services firm, has an established Modelling & Analytics team in Australia, providing a range of client services including insight and associated big data analytics. Exciting growth plans have created the need for additional consultants and managers to take up newly created roles, with a challenging engagement management and delivery brief. Full visa sponsorship and relocation assistance will be available.

Sydney & Melbourne, Australia

MARKETING ANALYSTS
£25,000 - £45,000

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

London

OR CONSULTANT
£Competitive + Benefits

Our client recently launched a major Yield Management initiative to optimise forecasting and ensure that product prices are both attractive to customers and yield competitive margin for the business. Additional modellers are now sought to support this programme, who can offer sound optimisation experience, good interpersonal skills and demonstrable commercial awareness. A good numerate or scientific degree, ideally supported by a relevant post graduate qualification (eg MSc Operational Research) and demonstrable analytical problem solving capabilities/proven modelling and data analysis skills essential.

Peterborough

HEAD OF YIELD DEVELOPMENT
£Competitive + Benefits

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

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

PRICING PERFORMANCE MANAGER
c£40,000 + Good Benefits

Leading organisation has established a new team focussing on the Direct Marketing and Media markets. Core to this will be a specialist Pricing Team working at the heart of their commercial business developing and deploying new pricing solutions. The successful applicant will have proven experience of complex Excel modelling and a sound commercial understanding of pricing elasticity, profit drivers and margin analysis. You will need excellent communication skills and an ability to capture insights from across the business to inform pricing strategy.

Central London

ANALYTICS CONSULTANCY – DUBLIN
£45,000 - £80,000 Negotiable DOE

Exciting opportunities, at Consultant and Manager level, to join a newly established centre of Analytical Innovation. A showcase for our client's predictive analytics capabilities, the centre will focus on the development of sophisticated analytical solutions to address customer insight, fraud and compliance challenges. Advanced analytic skills i.e. statistical analysis, predictive analytics, data mining required – the environment in which these have been gained is not sector specific but must be commercially driven; fraud and customer insight experience useful. SAS essential. **Dublin**

PROJECT MANAGER–RETAIL OPERATIONS
£40,000-£50,000 Negotiable DOE + Benefits

Our Retail Client is seeking an exceptionally able candidate who has the drive to deliver projects that tackle highly complex, cross-functional business problems. The role of the Project Manager requires strong candidates able to demonstrate their ability in project management, business judgement, communication skills and analytical leadership to help shape and guide data analysis in order to achieve the business need. Whilst retail experience is not required, you should be able to show a good understanding of retail operations and issues. **Hertfordshire (commutable from London, Liverpool Street)**

SAS MODELLING
£35,000 - £60,000

This specialist financial services consultancy, which provides risk modelling solutions to the credit, payments and fraud industry, seeks additional analysts to be based either at home or on client sites, offering strong interpersonal and client facing skills to complement their proven SAS modelling capabilities. A numerate graduate, you will need at least two years' analytical delivery experience and a solid understanding of consumer credit and risk. **Home Base/UK Wide Client Sites**

GRADUATE–GERMAN/FRENCH FLUENCY
£25,500 + Benefits

Enviably graduate opportunities available in the dedicated-country revenue and pricing divisions of this global automotive brand. With 0-12 months' experience in a numerate subject/discipline, successful candidates will need to be fluent in either German or French. In return, our client offers an unrivalled chance to springboard your OR career, learning optimisation, pricing, demand forecasting, segmentation and related techniques. **Bracknell**

RISK FORECASTING
To £50,000 + Benefits

Driven by a new 'risk' directive, this global sales and payments leader is looking to populate their newly created risk forecasting team, with an additional high calibre Analyst. The successful candidate will have c2 years post graduate experience, with demonstrable quantitative analytical and associated technical expertise {SAS, SQL or similar}. Previous risk experience is not essential but those from Consultancy, eCommerce or Finance will be given preference. **London**

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

Telephone: 01892 510892

Email: or@prospect-rec.co.uk

Web: www.prospect-rec.co.uk