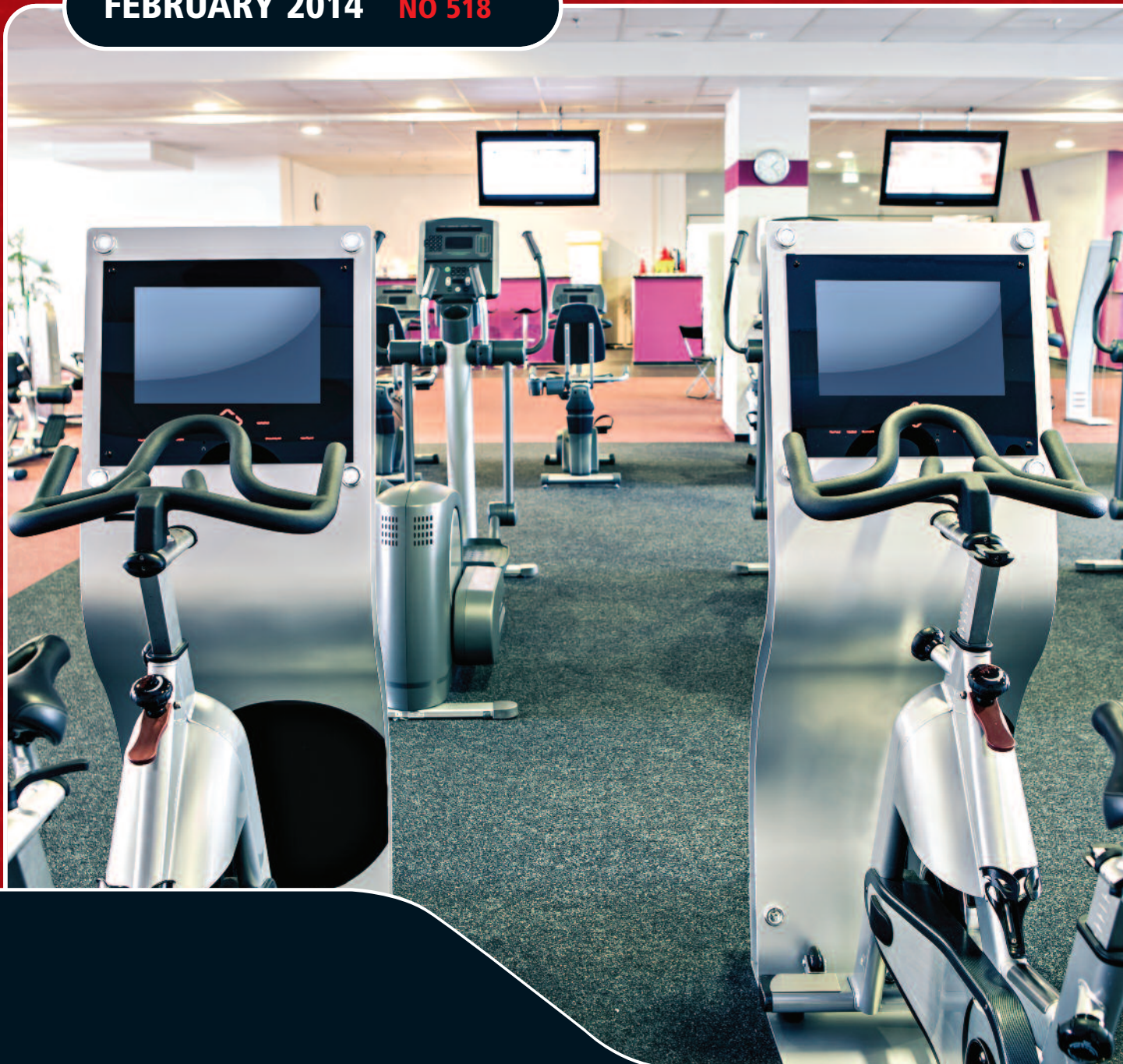


THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

FEBRUARY 2014 NO 518



ARE YOU UP FOR THE O.R. FITNESS CHALLENGE?

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

NEW SCIENCE OF BETTER WEBSITE GOES LIVE!
PIONEERS OF O.R. - PHILIP MCCORD MORSE
MONEY, MONEY, MONEY!
ARE UK COMPANIES MISSING A TRICK?



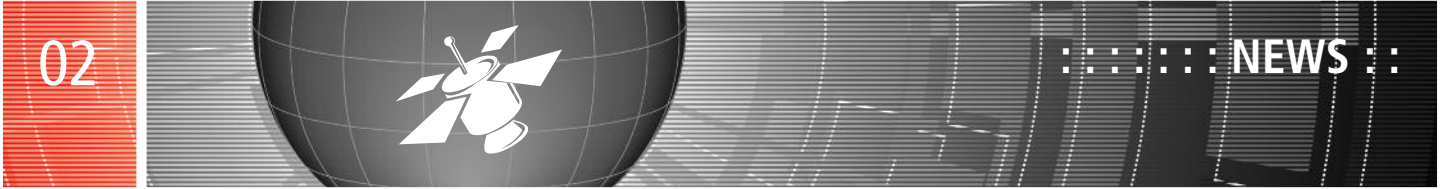
THE OR SOCIETY

DIAMOND JUBILEE

60 YEARS OF BETTER DECISIONS

1953  2013

www.theorsociety.com



ADVANCE YOUR CAREER PROSPECTS

Accreditation: What it is and why you should apply

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

There are three categories of accredited membership:

Fellow (FORS) - for high achievers with at least ten years' experience

Associate Fellow (AFORS) - for those with a successful track record over at least five years

Associate (AORS) - for suitably qualified recent entrants

Candidate Associate (CandORS) - for those either completing a degree with a substantial O.R. content or starting their first employment in O.R. Candidate Associates are appointed a mentor to help guide them through the first couple of years in their O.R. career.

The substantial benefits of this recognised professional achievement include:

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

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

www.theorsociety.com

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EDITORIAL

JOHN CROCKER

As most of you will have read, I have now retired after nearly 39 years at Rolls-Royce and its various subsidiaries.

As a leaving 'gift', one of my friends decided to set me a challenge which comprised five O.R.-related puzzles: choosing what to put in a knapsack to maximise survival within weight constraints; which people to select as crew to maximise my chances of reaching my destination alive; a 3-d intergalactic travelling salesman problem; how quickly a virus can spread throughout the world and where to drop two lots of aid to minimise the total distance villagers have to walk to reach the nearer of these drops. I have passed these onto Louise who may include them in her Y2OR articles over the next few months. If you read her article last month and was tempted to try to solve the problem she set, you can find out whether you got it right (mathematically, at least).

By coincidence, there was a paper in *JORS* in December which discusses hyper-heuristics. If such an algorithm was available, in theory it should have been possible for me to enter all five of my problems and it would have either told me which method to use for each or, if it was really clever, have solved each using the most appropriate method. As it happened, I was able to solve three using Excel and had to write programmes to solve the other two.

Also, by coincidence, Nigel has written an article about retirement and pension options. Alas, this is a few decades too late for me but fortunately, the Rolls-Royce pension, at least for old-timers like me, is one of the better ones - I just have to hope it will remain so.

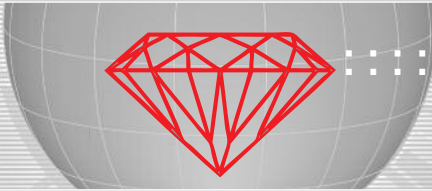
Now that I am retired, everyone thinks I have plenty of time on my hands to get involved in all kinds of activities. It is quite possible, once I have worked out some sort of routine that I will, indeed, have a little more time for such things as the Third Sector Pro Bono work, maybe a couple of books on various aspects of O.R. and, who knows, someone might even want to pay me for some of my time although it does not look like I am about to get a 'pay rise' for editing *Inside O.R.*

There have been discussions at Board level regarding the cost of providing *Inside O.R.* As you may have noticed, we are carrying fewer advertisements than a few years ago but alas the costs of publication have been rising so the burden on the Society has been increasing. One solution is to reduce the pagination but there has been much debate over which articles should stay and which should go. With some, we could simply reduce the length and leave you, the reader, to follow-up the links but this is not very convenient if you are reading the hard copy. If you would like to let me know which articles you particularly like or dislike this will be a great help. Also, how would you react if it was say 20% thinner? What should stay, what would you like to see kept and what would you like to see go (or, at least would cause you least concern)? My new email address is JohnFrancesCrocker@gmail.com or you can contact me through the OR Society.

<OR>

CONFERENCE NEWS

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



DIVERSIFICATION

JOHN HOPES, VICE PRESIDENT

The diversity of special interest groups, conference streams and publications available through the OR Society today reflects 60 years of growth and expansion of the field of O.R.



This diversity covers technical fields that include information systems, knowledge management, simulation, system dynamics, decision analysis, problem structuring and mathematical programming. While in terms of sectors and domains its coverage includes criminal justice, community, defence, health, developing countries and the third sector.

Analytics is just the latest example where the Society is responding to a shift in the market for O.R. in providing focused services to its members and the wider community. The explosion in data volumes within the digital economy has led to a similar expansion in the demand for analytics professionals delivering descriptive, predictive or prescriptive insights to support decision making. As a result many of those with a background in O.R. now find themselves working in fields such as credit scoring, customer analytics and data science. Similarly, many former O.R. groups have re-branded themselves under the analytics banner to reflect the emphasis given by the market.

The OR Society's analytics network connects professionals from academia, industry and government, some working in large groups, some working as lone analysts within an organisation or as independent consultants. It provides a forum to exchange ideas and experiences in what is a rapidly evolving field, with a combination of physical events, online discussion and virtual meetings.

In addition to providing the network, the Society supports the analytics community through its training programme, its one day events, its conference streams focused on analytics and articles in Inside O.R. It is also planned that an analytics journal will be launched, continuing the Society's strong tradition of providing a platform for research.

Major trends such as technology-driven change, globalisation and demographic shifts will continue to drive demand for decisions based on high quality analysis and modelling. These decisions could range from government policy and corporate strategy options to those embedded in automated processes or consumer choices. All these areas provide O.R. with opportunities; and the increasing availability of data expands the range of potential solutions still further.

Many sources have estimated that there will be a massive shortfall in the supply of advanced analytical talent over the next five to ten years. The skills required will be the ability to draw insights from data and then apply these in practical problem solving. Given its excellent fit with these requirements there has never been a better time to be in O.R. And, given the support that it provides to professionals working in this space, there has also never been a better time to belong to the OR Society.

'Analytics is just the latest example where the Society is responding to a shift in the market for O.R. in providing focused services to its members and the wider community.'



SW14 SIMULATION WORKSHOP – BOOK BY 19 FEBRUARY 2014 TO SECURE DISCOUNTED RATES

ABBEY HOTEL GOLF AND COUNTRY CLUB IN WORCESTERSHIRE ON 1 TO 2 APRIL 2014.

The Simulation Workshop reduced registration rates deadline, has been extended to Wednesday 19 February 2014 to allow all of those whose Practitioner Case Studies and Posters have been 'Accepted', to take advantage of the lower rates.

So, don't delay – go to www.theorsociety.com/SW14 and submit your case studies and posters straight away – deadline 14 February 2014!

TO ALL those presenting at SW14 - now is the time to BOOK and PAY ONLINE as soon as possible.

SW14 will provide an opportunity to exchange ideas on the current and future state-of-the-art in simulation and modelling. The programme consists of a keynote presentation, a panel discussion and parallel streams.

Plenty of time has been built in between sessions and the conference dinner to provide an excellent opportunity for networking. The exhibition area includes some of the latest developments in simulation software tools.

Keynote Speaker

Professor Barry L. Nelson from the Department of Industrial Engineering & Management Sciences, Northwestern University, USA.



Professor Nelson's keynote speech is entitled 'Why Good Simulations Go Bad'. His talk describes common ways that good simulations go bad and how to avoid (or at least recognise) them. Lots of examples will be provided to support the technical points.

Professor Nelson's research is on the design and analysis of computer simulation experiments on models of discrete-event, stochastic systems,

with applications to manufacturing, services, finance and transportation.

He has published numerous papers and three books, including *Discrete-Event System Simulation*, 5th edition (2010), and *Foundations and Methods of Stochastic Simulation: A First Course* (2013). Nelson is a Fellow of INFORMS and IIE. In 2006 he received the Outstanding Simulation Publication Award from the INFORMS Simulation Society for his work on simulation optimisation, and in 2007 and 2010 he was awarded the Best Paper-Operations Award from *IIE Transactions*.

He has also received the Northwestern University Alumni Association Excellence in Teaching Award, and has twice been named McCormick Teacher of the Year in engineering at Northwestern.

Booking and payment

An online booking and payment facility is now available at www.theorsociety.com/SW14 and there is a substantial early booking discount available for bookings received by 19 February.

The conference fee is all-inclusive and includes attendance at all conference sessions and a copy of the conference proceedings, together with lunches and mid-session teas and coffees.

Accommodation fees

Single occupancy en-suite bed and breakfast accommodation fees for a delegate are £80.00 + VAT per night and includes evening meals. Double Occupancy en-suite accommodation fees will be £100.00 + VAT per night and includes evening meals for the delegate. Lunch and evening meals for guests and those not requiring accommodation will be charged separately i.e. lunch £18.00 per person per day, Monday dinner £26.40 per person, Tuesday gala dinner £32.40 (all including VAT).

Full details can be found at www.theorsociety.com/SW14

We look forward to welcoming you to SW14 in April.



The 2012 exhibition



CSCI UK

O.R. AND SCIENCE – WOULD YOU WANT TO BE A CHARTERED SCIENTIST?

RUTH KAUFMAN

The Board of the OR Society is considering the possibility of becoming licensed to award Chartered Scientist status. What is this all about, and is it worth doing?

In 2013 the OR Society became a member body of the Science Council, a membership organisation bringing together learned societies and professional bodies across science and its applications. The Science Council promotes the advancement and dissemination of knowledge and education in science for public benefit. It currently has around 40 members, including the Institute of Physics, the Royal Statistical Society, and the IMA.

The Science Council defines science as 'the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence' – a definition that both the Science Council and the OR Society Board agreed was sufficiently broad to encompass O.R.

Some years ago, the Council developed the Chartered Scientist (CSci) designation, 'recognising high levels of professionalism and competence in science'. Their intention was to benefit **the public, the profession, employers and individuals**, by having a badge of competence and professionalism that could be trusted; by encouraging networking, promoting continuing professional development (CPD) and benchmarking professional competence levels; and by providing a qualification which could be recognised widely beyond the specific discipline or sector, and demonstrate professionalism and commitment.

The Science Council does not award CSci itself, but licenses its member bodies to award CSci to their own members who meet the standards. So should the OR Society embark on the long arduous process to become licensed? What is in it for us, for our profession, and for our members?

Chartership, accreditation...what's the difference?

When the OR Society brought in its accreditation system many years ago, it was an enormously controversial issue. Critics saw accreditation as pinning down and ossifying an activity which should be continually developing and growing, adapting as necessary to novel issues and circumstances, and which is in many ways an art or craft as much as a science. Proponents argued that O.R. was indeed a professional activity, which would gain by being recognised as such; and that by focusing as much on the skills and behaviours of applicants as on their specific knowledge and expertise, accreditation need not restrict or label what constitutes O.R.

CSci also focuses on skills and behaviours: for example, 'Exercise self-direction and originality in solving problems, and exercise substantial personal autonomy in planning and implementing tasks at a professional level'. Indeed, although the language is different, the requirements of CSci are very similar to those of accreditation at around the AFORS level.

There are two main differences between the awards:

- CSci has more demanding CPD requirements. Evidence of CPD in the previous two years is necessary as part of the application; and a Chartered Scientist must commit to on-going CPD and be ready to present a record of this when required;
- a CSci must comply with a professional code of conduct.

Is it worth doing?

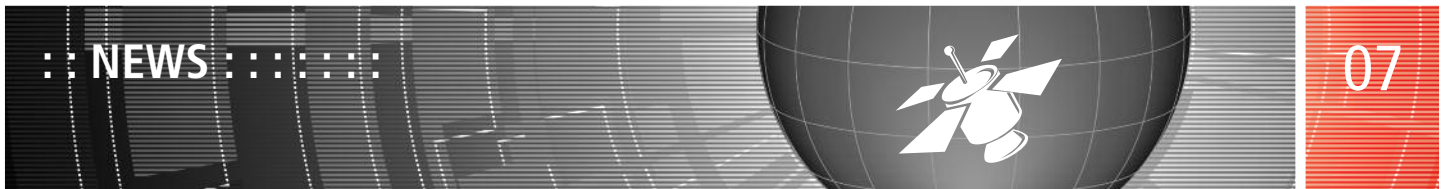
Accreditation has proved less popular than originally expected, with only around 10% of OR Society members currently being accredited. UK employers have not insisted on accreditation, even where they have encouraged it. Would CSci be any different?

Possibly. CSci, along with the other charters, is well-recognized internationally. Carrying an externally recognised badge may help raise the profile of O.R. professionals in their organisations, and be attractive to existing or potential members, whether as an add-on to, or instead of, the existing accreditation scheme.

And if individuals do take up CSci, and engage more systematically in CPD and networking, as is required to maintain CSci status, that is certainly for the good of the profession.

But it would be a significant undertaking for the Society requiring investment in both time and money, so members' views are important. What do you think? To comment, please write to: gavin.blackett@theorsociety.com

For more information about the Science Council go to www.sciencecouncil.org; for more information about Chartered Scientist go to www.charteredscientist.org



BEALE LECTURE 2014

Open event - The Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG
Thursday 27 February 2014

There are still a limited number of places available

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

Mark Elder (founder of SIMUL8 Corporation). 2012 winner of the Beale Medal.

Title: Journeys of Discovery

In conducting an O.R. consulting project there is often a conflict between professionally following a carefully drafted project plan that has been agreed in advance with the client and, on the other hand, intuitively following a journey of discovery that emerges during the modelling process as the most likely route to solve the problem. It's a dilemma I've been struggling with since the first days of my career as an O.R. practitioner after a low-probability event accidentally led to me to falling into the field of simulation. A number of collaborators, over the years, have helped me to find some answers. In this talk I draw on various incidents and stories to illustrate that clients are better off if occasionally we, as O.R. people, refuse to do as they ask. I offer some experiences on how to get away with this approach and some thoughts on the fundamental reasons why it leaves the clients happy.

Richard Wood, (Lloyds Banking Group, London - previously at Cardiff University). 2011 PhD prize winner.

Title: Modelling Activities at a Neurological Rehabilitation Unit

A queuing theory based approach is developed for modelling patient flows at the national neurological rehabilitation unit for Wales. Due to high demand this major in-patient facility is almost always at full capacity, and with a significant bed-cost per day this makes it a prime candidate for mathematical modelling. Central to this study is the concept that treatment intensity has an effect on patient length of stay. Taking into account staff and patient availability, patient complexity and therapist proficiency, this scheduling program allows for a wide range of relevant hypothetical scenarios to be considered and evaluated on the grounds of a number of performance measures and cost implication. This talk will highlight the benefits that O.R. can bring about in healthcare, as well as the advantages gained in combining a number of traditional O.R. techniques within a hybridised model.

<OR>

Further information can be found at www.theorsociety.com/Pages/Conferences/Beale/beale.aspx

Lectures start at 3.00pm

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

There is no charge for attendance at this event. To register please go online to the web address above and fill in the online reservation form. For queries contact Hilary Wilkes on hilary.wilkes@theorsociety.com

THE OR SOCIETY ANNUAL CONFERENCE – ROYAL HOLLOWAY UNIVERSITY OF LONDON – 9-11 SEPTEMBER 2014

The co-chairs of OR56 are Andy Verity-Harrison (FICO) and Giles Hindle (University of Hull). Both co-chairs have experience with quantitative and qualitative O.R. methods and are excited by the growing interests in analytics in general.

This synergy has led to the following choice of plenary sessions for 2014: Stewart Robinson, the incoming President of the OR Society, will discuss strategic issues for the O.R. community, including opportunities associated with the analytics movement; Andrew Jennings, Chief Analytics Officer of FICO, based in the USA, will show how Analytics permeates modern financial life and our day-to-day activities; and Gilberto Montebello of LSE will coordinate a plenary discussion session on Behavioural O.R. Broadly speaking, Behavioural O.R. studies the human element within O.R. modelling and also the use of models in problem solving and decision making.

WHO'S WHO AT OR56?

Introducing our two co-Chairs and the Plenary speakers

CO-CHAIRS



Andy Verity-Harrison - *Senior Consultant, Analytic Consulting, FICO (Fair Isaac Corporation)*

Andy graduated with a Mathematics Degree from the University of Warwick in 1991 and has a PhD in the Application of Optimisation in Defence and Logistics from the University of East Anglia. He's had a varied career that started in research with the Ministry of Defence (MoD) which led to a move into Operational Analysis where he applied a range of methods from the quantitative to more qualitative techniques such as Multi-Criteria Decision Analysis, problem structuring and facilitation to support a range of MoD business cases. A move out of government led to the application of a broad O.R. toolkit to asset management in the highways and energy sectors.

Andy now works for FICO where he leads the delivery of Operational Research consultancy for clients across a wide range of sectors covering Europe, Middle East and Africa. Throughout his career he has continued to focus on the application of combinatorial optimisation. He is a Fellow of the OR Society (FORS) and the Institute of Mathematics and Its Applications, chairs the Midlands OR Society and sits on the Heads of O.R. Forum.



Giles Hindle - *Senior Lecturer at Hull University Business School and an Associate Fellow at Warwick Business School.*

Dr. Giles Hindle has combined an academic career with consulting practice. Prior posts include Assistant Professor at Warwick Business School, Senior O.R. Consultant for Tribal Consulting plc, Director of Health Consultancy Services Ltd and Honorary Lecturer at Lancaster University Management School. Giles has research, consulting and teaching experience with both quantitative and qualitative approaches and has practiced in both the public and private sectors. He has conducted consultancy and research projects for a wide range of clients including the NHS Scottish Executive, County Councils Network, Secta Health Group, Countryside Agency, Department for Transport, Department for Health in N. Ireland, Network Rail plc, Tornado Wire Ltd, Northern Hi-Tec Ltd, and many others. Giles is an award winning teacher on the Warwick MBA and has developed innovative analytics masters courses for the universities of Warwick and Hull.

He is co-secretary of the OR Society's Special Interest Group in Problem Structuring Methods, and a member of the Centre for Systems Studies at the University of Hull. He has specialist knowledge in soft systems thinking and quantitative modelling which he has practiced in both strategic and operational contexts. His current research is focussed on systems modelling, soft systems methodology, spatial modelling and service innovation.

PLENARY SPEAKERS



Stewart Robinson - *Loughborough University and President of the OR Society.*

Stewart Robinson holds an honours degree in Management Science and a PhD in Management Science, both from Lancaster University. Stewart started his career as a business analyst for a shoe retailing company and then as a consultant with ISTEEL (now Lanner Group). During this time he gained much experience in performing and supporting simulation studies with a wide range of organisations.

In 1992, Stewart moved to Aston Business School where he lectured

in Operations and Information Management. Stewart then spent 13 years at Warwick Business School (1998-2011), from 2005 as Professor of Operational

Research. He held various roles during his time at Warwick including Associate Dean for Specialist Masters Programmes, and Head of the Operational Research and Management Sciences Group.

He joined Loughborough in July 2011 as Professor of Management Science. His research focuses on simulation methods: discrete-event simulation, system dynamics and agent-based simulation. Stewart is President of the OR Society, co-founder of the Journal of Simulation, and co-founder of the OR Society Simulation Workshop conference series.



Andrew Jennings - Chief Analytics Officer, FICO

Andrew Jennings joined FICO in 1994 as director of our European operations in the U.K. Since then he has managed a number of business units including Financial Services, Customer Management Solutions and

International sales and delivery. He is currently Senior Vice President and Chief Analytics Officer responsible for analytic strategy and analytic development.

Immediately before taking this role he was responsible for software and analytic product management of FICO's Origination, Fraud, Customer Management and Collections offerings. Prior to joining FICO, Jennings worked in credit risk management for Abbey National plc and Barclays plc. He also served as a lecturer in economics and econometrics at the University of Nottingham. He has a BA and Ph.D. in economics, and an MSc in Agricultural Economics



Gilberto Montibeller - London School of Economics (Behavioural Operational Research Plenary Panel.)

An expert on Decision Analysis, Dr Montibeller has extensive experience in applying it during the past 15 years, consulting to both private and public organisations in Europe and South

America. He started his career as an executive at British and American Tobacco. Moving back to academia, he was awarded a master's (UFSC, 1996) and a PhD in Production Engineering (UFSC/University of Strathclyde, UK, 2000). He then continued his studies as a Post-Doctoral Research Fellow in Management Science at the University of Strathclyde.

Dr Montibeller is Area Editor of the Journal of Multi-Criteria Decision Analysis and a member of the executive committee of the International Society of Multi-Criteria Decision Making. He has published several papers in top scientific journals in the field, such as the European Journal of Operational Research, Decision Support Systems and OMEGA - The International Journal of Management Science.

His main academic interest is on supporting strategic decisions in organisations which involve multiple and conflictive objectives, as well as uncertainties about the best way forward. His field of expertise and academic focus is decision analysis, in particular multi-criteria decision analysis, a set of scientific methodologies for supporting strategic decisions that involve multiple and conflicting objectives.

<OR>

MISSING MEMBERS

We have had a problem contacting the following people by email – Can you please email us at carol.smith@theorsociety.com and update your contact details ASAP.

Dr. Nicholas A. Pearson

Mr D J Faddy

Dr D A Conway FORS

Mr N Ramparsad

Mr. Nigel D. Carter

Miss K.A. Hassan

Mr R M Johnson

Ms C Peachey-Pace

Mr A H Rooney AFORS

Miss M Charlesworth

Mr. E.P. Martley

Mr. Pascal .A.J. Massawe

Mr V Zatsepin

OR56 CALL FOR PAPERS

Royal Holloway University of London, Egham, Surrey, UK. TW20 0EX
9 - 11 September 2014

The planning for the OR Society's Annual Conference, OR56, is well underway and the Conference Committee is in place to make sure things run smoothly.

We now need to encourage a supply of interesting, informative and challenging papers. Academics, practitioners, researchers and students with interests in any aspect of Operational Research are invited to present their work at OR56.

Details of all streams are available on our website. **The Title and Abstract Submission System is now open at www.theorsociety.com/OR56.** Prospective authors are, of course, welcome to discuss proposals for papers with stream organisers in advance of submission.

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



Royal Holloway University of London

Important Deadlines

– please note that these may be subject to change

January 2014	Submission of abstracts starts
13 June 2014	Deadline for submission of Titles and abstracts to appear in the Conference Programme.
13 June 2014	Deadline for submission of full Keynote Papers and Extended Abstracts.
21 June 2014	Notification of Acceptance to be sent re Keynote Papers and Extended Abstracts.
30 June 2014	Deadline for early reduced registration fee
02 July 2014	Deadline for final revision of abstracts. Presenters can make changes up to this date.
18 July 2014	Deadline for registration if the abstract or paper is to be scheduled for presentation. Thereby ensuring their talk will appear in the final programme.

The conference committee reserve the right to exclude papers if bookings are not made by this date.

The Conference Committee

Andy Verity-Harrison, <i>FICO</i>	
Joint Chair	andyverityharrison@fico.com
Giles Hindle, <i>University of Hull</i>	
Joint Chair	giles.hindle@hull.ac.uk
Christopher Haynes, <i>Dstl</i>	
Programme Scheduler	cehaynes@mail.dstl.gov.uk
Pavel Albores, <i>Aston University</i>	
Programme Co-ordinator	p.albores@aston.ac.uk
Sophie Carr, <i>Bays Consulting Ltd</i>	
Programme Co-ordinator	sophie@baysconsulting.co.uk
Martin Keys, <i>Dstl</i>	
Social Event Organiser	mkeys@dstl.gov.uk
Hilary Wilkes, <i>The OR Society</i>	
Conference organiser	hilary.wilkes@theorsociety.com
Keynote Editor	Volunteer required!!

We look forward to seeing you at Royal Holloway.

IFORS NEWS

SUE MERCHANT

Maths in Agriculture, Analytics in Ireland, Decision-making in China and much more!

Agriculture

Members who didn't have a chance to attend the EURO conference in Rome will have missed a most interesting paper which won the **2013 EURO Excellence in Practice** award: this is summarised in an article on page 10 of the News. The article describes how different lots of land were consolidated with the agreement of farmers following much modelling work by the winning team. The diagram below shows how the land lots were distributed before the analysis and the article shows the 'after' picture too!



Figure 1. An agricultural region with 9 farmers and 979 lots. Different colours represent different farmers who cultivate the lots.

Analytics in Ireland

The article on page 21, by Cathal Brugha, describes the Irish journey from O.R. to analytics. He comments

The most significant impact of the change towards Analytics is the rapid growth in the number of part-time students, and the extension of the scope of

dissertations, crossing the full spectrum of economic activity, breaking out of the traditional O.R. model and becoming more mainstream management. The focus is now more general, on technical approaches to the analysis of any kind of problem, using very broad and powerful tools and methodologies.

Political Decision Making Processes in China and O.R. Support

This article on p 16-18 by Ulrike Reisach covers the political and decision making structure in China and how O.R. is and could be used there. There are a great many references cited which anyone interested in this subject may find very useful.

Book review of Essentials of Business Analytics by Jeffrey D Camm, James J Cochran, Michael J Fry, Jeffrey W Ohlmann, David B Anderson, Dennis J Sweeney and Thomas A Williams (p15). Anyone interested in Analytics may find Hans Ittman's review helpful. He concludes: *'All seven authors of the book are seasoned educators with impressive track records. They include proven materials from classic textbooks they have written. The logical flow of material makes the book easy to understand, follow and read. It is a complete material for students and a comprehensive book for practitioners who want to keep up with developments in analytics.'*

Tutorial on O.R. in biomedicine by Panos Pardalos

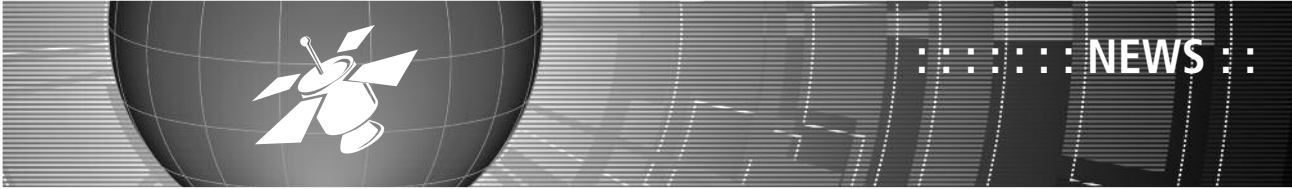
Optimisation and data analysis algorithms in biomedicine are discussed on pages 18-20. The report briefly describes recent work on Raman spectroscopy and data mining for cancer research and network tools in studying the Parkinson brain.

(See <http://ifors.org/newsletter/december-2013.pdf> for the whole newsletter)

<OR>

MAKE SURE YOUR CONTACT DETAILS ARE UP-TO-DATE

Contact Carol Smith
carol.smith@theorsociety.com
 or go online to www.theorsociety.com
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NOW IS THE TIME TO SAY GOODBYE!

NIGEL CUMMINGS

Statistics published by the Office for National Statistics reveal that that people are working, or to be precise, remaining in paid employment for longer.



The average age at which people leave the labour market – a proxy for average age of retirement – rose from 63.8 years to 64.6 years for men and from 61.2 years to 62.3 years for women between 2004 and 2010.

The ages, at which men and women retire, peak around State Pension Age (SPA) (i.e. 65 and 60 respectively). At the same time, life expectancy for both men and women is also increasing. The current estimates are that whilst there were some 3.2 people of working age for every person over the SPA in 2010, this figure (the ‘old age support ratio’) will fall to around 2.0 by 2051 if the SPA does not change. However, by 2046, the SPA for both men and women is expected to be 68 under current legislation.

Needless to say, there is a plethora of pension plans that one could take up and each will have its own advantages and disadvantages for the employee, employer, pension provider and the state. The balance in favour of one or the other will also change over the life of the plan, not just at the time the employee retires (or starts to draw a pension).

In a paper published in the SIAM Journal on Applied Mathematics, authors Carmen Calvo-Garrido, Andrea Pascucci, and Carlos Vázquez have presented a partial differential equation (PDE) model governing the value of a defined pension plan including the option for early retirement.

A ‘defined pension plan’ is typically based on the employee’s number of years of service at the time of retirement and his or her final or average salary.

The model assumes that the wage or salary of an employee at any given time is governed by a stochastic differential equation, which in turn depends on the time of recruitment, current salary of the employee and age of entry.

Uncertainty of the salary is assumed to depend only on volatility, which refers to the uncertainty or risk associated with a value or asset. The optimal retirement problem is a ‘free boundary problem’ for the underlying PDE where the ‘free boundary’ is the point of transition from employed to retired.

According to M. Carmen Calvo-Garrido, ‘From the numerical solutions, we can identify at each date, for a given salary and average salary, if it is optimal to retire or not, and also to obtain the value of the pension plan in any case.’

Future directions may involve the application of similar modelling techniques to study the evolution of wages and salaries. ‘We are working on a more complete model for salaries evolution that includes the possibility of jumps (due to economic crisis, sudden increase or decrease in salaries, etc),’ says Vázquez. ‘PDE problems including realistic, stochastic interest rate models also present a very challenging topic. The calibration of model parameters is an interesting and difficult problem due to the need of suitable real data.’

<OR>





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ARE YOU UP FOR THE O.R. FITNESS CHALLENGE?

**PROFESSOR JO SMEDLEY, CHAIR
EDUCATION AND RESEARCH COMMITTEE**



‘Academics focus on topics that relate to the academia targets that they need to meet and practitioners focus on achieving industrial expectations.’

As I write this article, it is the start of a New Year – a valuable time to reflect on ‘what works’, assert new behaviours and plan new projects. In January the gyms and Weight-watchers meetings are full of people embarking on new health and fitness regimes. By the time you read this, the chances are most will be empty again.

We all know it makes sense but practically, it is not quite that simple! Having observed this phenomenon for several years, it caused me to reflect on why people behave in this way – such good intentions for all the right reasons to be dashed so readily and at such cost!

The gym clientele are analogous with academic and practitioner perspectives in O.R. During my career, I have had the good fortune to be able to listen to prestigious academics and practitioners sharing on the impact of their work. My outlook was a mix of both academic and practitioner. Academic methods were interesting and many of my undergraduate days were spent perfecting techniques..... but my real interest came from the stories of application in practical situations – particularly those when people benefitted in terms of practice, cost or achievement. Bringing meaning alive is an important aspect to keeping audiences entertained.

There are several links here to O.R. Providing valuable academic and practitioner perspectives, O.R. enables people from varying backgrounds but with the same overall aim of enhancing practice to collaborate. All too often, cultural language gets in the way. Comments such as ‘I don’t understand, equations are nice but it’s the people that make it!’ or ‘The outcomes are not clear – talking is nice but it’s the tangible benefits that are needed’ abound.

We, as O.R. professionals (whether academic or practitioner) all aspire to similar aims but the message gets lost in the words. Result? Academics focus on topics that relate to the academia targets that they need to meet and practitioners focus on achieving industrial expectations. Breaking down these barriers is not easy but doing so should yield considerable benefits to both sides.

During the last two years, the OR Society has supported the development of emerging topics across Operational Research through seven Charitable Projects overseen by the Education and Research Committee. One is looking at the keywords that are used to describe analytics, another has considered approaches to further develop the O.R. in Schools initiative, and a third is looking at the range of existing contacts with ESRC.

With a focus on communication across O.R. communities, regular features on the projects have been included in Inside O.R. during 2013 to highlight progress with continuing dialogue through social media. Some have been completed, some are in progress and others are just commencing. All are designed to break through cultural barriers to share the real meaning of O.R. and how it can help real-world developments and awaken interest in O.R.

So back to my initial analogy with the gym at New Year. Presenting the message of O.R. and using appropriate academic and practitioner languages to spread the O.R. word effectively to our

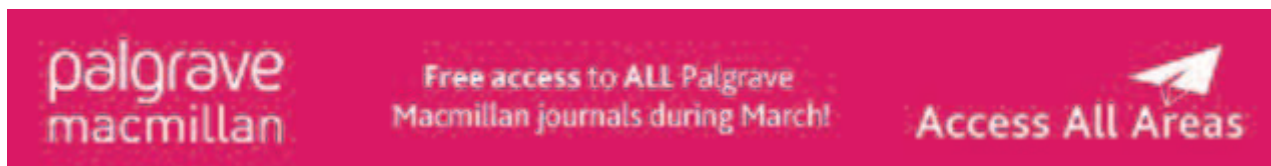
various audiences continues as a challenge...but if we can stick at it then we will see the benefits we know are there for the taking. Are you up for the O.R. fitness challenge?

For those who are interesting in finding out more, further information is available here - <http://www.theorsociety.com/Pages/PromotingInvesting/CharitableProjects.aspx>.

<OR>

PALGRAVE MACMILLAN: ACCESS ALL AREAS 2014

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER



From 1-31 March, 2014, Palgrave Macmillan will be running its Access All Areas promotion. All journals, including the OR Society journals, will be free to view online. The aim is to provide an opportunity for readers in allied areas and prospective subscribers to fully explore the quality and breadth of our journal content. Please help us spread the word!

How can you make the most of this promotion?

- Explore articles from the full portfolio of Palgrave Macmillan journals in OR/MS:
 - <http://www.palgrave-journals.com/orms/>
- Ask your institutional librarian to request a free trial. This will allow them to monitor usage during Access All Areas and help identify titles that can provide ongoing benefit to your institution after the promotion has closed.
- If you are a contributor to:
 - *Journal of the Operational Research Society*
 - *European Journal of Information Systems*

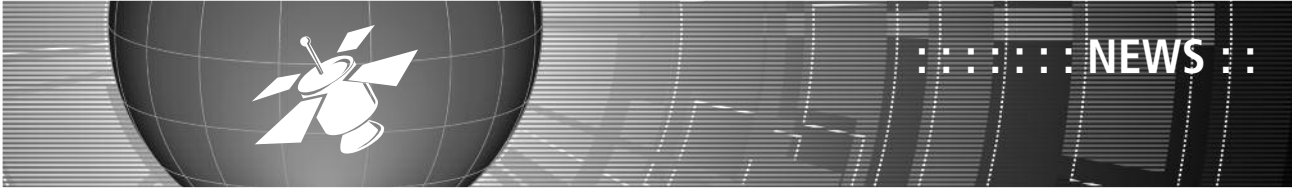
- *Journal of Simulation*
- *Knowledge Management Research & Practice*
- *Health Systems*

This promotion is a great way to extend the profile of your contribution. We encourage you to share your papers with colleagues and contacts.

For more information about Access All Areas please visit:

www.palgrave-journals.com/accessallareas

<OR>



NEW SCIENCE OF BETTER WEBSITE GOES LIVE!

The new Science of Better website has now been launched at www.scienceofbetter.co.uk



The new site replaces that which was first used over ten years ago – at a time when most of the hand-held devices we now take for granted weren't even thought of! So, of course, the new site works perfectly on tablets and smart phones – from which over one-third of visits are now made. Please take a few minutes to have a look around what is, we hope, a very intuitive site.

As well as explaining to visitors what O.R. is and how it can be of benefit to their organisation, the site contains resources pages featuring Frequently Asked Questions, a Glossary and 'How to...' Guides. Our stock of 'Success Stories' has been polished up and there's a function for visitors to find an O.R. Consultant.

OVER TO YOU...



If you are regularly asked particular questions, please let me know and I'll add them (and your answer!) to this feature.

Similarly, if you would like to add words and definitions to the O.R. glossary, please get in touch at graham.sharp@theorsociety.com

New success stories very welcome!

There is no doubt that one of the best ways of explaining the value of O.R. is through current success stories. As ever, I'm looking for new ones to freshen up the supply: we need fairly recent cases, ideally UK based, that the visitor from the business community would find interesting and helpful.

We're very happy for these stories to include reference to your consultancy, your special skills, your software or whatever you'd like to showcase:



TRW Automotive is one of the world's leading suppliers of car accessories. Founded in 1999 and located in Jablonec nad Nisou in the Czech Republic, Lucas Verity 5.7.0 is a division of TRW Automotive focused on the development, manufacture and sale of hydraulic brakes.

The Problem
Faced with a challenge to reduce its operating costs by 10%, the company worked with consultancy DYNAMIC FUTURE to deploy Lamarr's predictive simulation platform, WITNESS.

It need not be very long, and should be written in non-technical language under the headings The Problem, The O.R. Solution and The Value. You're welcome to add a paragraph or two about you, too.

Be a part of the O.R. Professionals Directory – IT'S FREE!
There is now NO CHARGE to register to have your name and company name added to our searchable database. As part of the 'Science of Better' marketing campaign we will be sending prospects to this database in search of the services you offer.

To have your details searchable at the www.scienceofbetter.co.uk Professional Search facility please go to <http://tinyurl.com/lqx857h> where you can complete and submit a form. To qualify for this free service, an organisation registering must have one or more fully paid-up members of the OR Society on their staff.



Training for 2014

Approved courses in O.R. and Analytics

THE SCIENCE OF DATA VISUALISATION

4 March, Birmingham

£600 + VAT for OR Society members

Hands on course

NEW FOR 2014

Course provider: Flying Binary

These days, we can all create charts with one click. It's easy - so why do they sometimes look so wrong? It turns out that we must learn a new language, get to grips with core components and apply a structured process! During the day we will mix presentation, video, real published examples and workshop exercises to equip you for the exciting adventure that is modern data visualisation.

You will learn how visuals are hardwired into our biology; why some charts elucidate and some obfuscate; the six simple steps in the visualisation cycle; how to transform your interaction with decision makers; why action must flow from every successful visualisation

SUPPORTING STRATEGY

5-6 March, Birmingham

£1,150 + VAT for OR Society members

Hands on course

Course providers:

Frances O'Brien, John Morecroft

Develop expertise in deploying frameworks, methods and models to support strategy development. We look at the use of manual and computerised techniques for conducting various strategy development activities such as setting direction, creating strategic initiatives, making sense of internal and external environments.

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

BUSINESS INTELLIGENCE WORKSHOP

12 March, Birmingham

£555 + VAT for OR Society members

Course provider:

Dweomer Consultants Limited

Understand the capabilities and limitations of OLAP tools and how they differ from other reporting and analysis tools; learn how to use dimensional modelling techniques and understand the key challenges and trade-offs faced in managing a successful business intelligence / data warehousing initiative.

Learn how to participate in the design of data marts and OLAP based applications; Understand the technical, political and change management issues that need to be addressed to benefit from investing in business intelligence and data warehousing.

FACILITATION SKILLS

13 March, Birmingham

£465 + VAT for OR Society members

Course providers:

Rachel Bodle

A course where both beginners and those with some experience can review and practice the skills needed to add value at the interface with clients and other project stakeholders. Using questions to encourage participation and elicit unbiased information.

Valuable opportunity for delegates to practise specific skills and learn from supportive peers (rapport, active listening, facilitative interviewing, handling group dynamics, inquiry, concept mapping, etc). Professional development: facilitation skills are a key component of the interpersonal skills needed for more influential, strategic roles; These skills are at the heart of managing client relationships

IMPROVING QUALITY AND PERFORMANCE

18 March, Birmingham

£470 + VAT for OR Society members

Hands on course

Course provider: Max Moullin

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

Find out about the latest developments in performance measurement; Ensure that performance measures are aligned with service user and stakeholder needs, with the organisation's strategy, and the processes used to achieve it; Keep up-to-date with developments in quality management and be able to advise on developing quality user-focused public services; Learn how to use the balanced scorecard and strategy mapping

SIMULATION: A PRACTICAL GUIDE TO DEVELOPING & USING MODELS

25-27 March, Birmingham

£1,680 + VAT for OR Society members

Hands on course

Course provider: Stewart Robinson

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

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

For details of all courses and to book online, visit www.theorsociety.com or call Jennie Phelps on 0121 234 7818



Y2OR: THE SOLUTION

LOUISE MAYNARD-ATEM

This month I shall be handing the reigns over to Richard Wood, a young O.R. Society member who will be discussing his O.R. experiences both within and outside of academia.

Before I do though, I would like to thank all of those who sent me solutions to last month's linear programming problem. I thoroughly enjoyed reading your submissions and matching them to my own. I had some positive feedback indicating that you found the article both interesting and useful so I'll be sure to make technique based articles a regular feature. I thought I would publish one solution in particular, submitted by Alexander Finlayson, a senior lecturer at Teeside University:

Thank you also to Mark Montanana, who sent in the same solution. Mark also pointed out that the model gives a zero answer for the premium red, as it is made largely from the most scarce grape (cabernet sauvignon), despite being the most expensive. This brings

me back to the limitations of the technique that I mentioned in last months article; for example the technique does not take into account such factors as consumer demand.

Did your solution match Alex's and Mark's? Get in touch with your thoughts on the article and what techniques you would like to see demonstrated on future problem pages. As always, my email address is Louise.Maynard-Atem@dh.gsi.gov.uk and I'd love to hear from you, whether it's techniques you'd like to know more about, topics you think these articles should cover or if you want to take a leaf out of Richard's book and write a contribution yourself.

<OR>

	House Red	Premium Red	Cabernet Sauvignon	Zinfandel	Total Profit			
	x_1	x_2	x_3	x_4				
Litres to Produce	27631.58	0.00	11000.00	7894.74	£ 75,631.58			
Profit per Litre	£ 0.90	£ 1.60	£ 3.00	£ 2.25	LHS = litres used		RHS = max available litres	Raw Material Supply
Supply Constraints	Pinot Noir	0.20	0.20		5526.32	<=	15000	30000
	Zinfandel	0.30			15000.00	<=	15000	30000
	Gamay	0.50	0.20		15000.00	<=	15000	30000
	Cabernet Sauvignon		0.60	1.00	11000.00	<=	11000	22000
Blending Parameters								

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

WHY I WORK IN O.R.

RICHARD WOOD

Since reading Louise's recent Y2OR columns aimed at those in their early career, I thought it would be a good idea to chip in with some of my experiences in O.R. to date; hopefully giving younger members a flavour of the interesting and exciting opportunities that await them following graduation.



First off I suppose it is worth saying that I consider myself very fortunate to have started my higher education at a university with such a strong base in O.R. At college I developed a keen interest in the application of maths to real-life problems but was never really aware of what operational research was all about until I started at Cardiff University back in 2005.

Following on from a very O.R.-based undergrad degree, I stayed on at Cardiff to study for a Ph.D. under the supervision of Jeff Griffiths and Janet Williams. For anyone who has developed a real interest in O.R. and has a passion for learning more, a higher research degree should be a consideration. For me, it was also a way to further postpone any decision about what I wanted to do in life – and to enjoy another three years of being a student! A particular asset of an O.R. Ph.D. is the blend between theory and practice; opening the door for a career as either an academic or a practitioner.

I actually chose a mixture of these, opting for a role in bioterrorism analysis at the Health Protection Agency. This seemed a natural choice given that my doctorate was in health management – however, the application was very different. To begin with I worked on statistical threat assessments for the Olympic Games, but my major commitment was creating a model for host reaction following

inhalation of an anthrax-like bacteria. This model was then used to evaluate the efficacy of potential medication strategies in the event of a terrorist attack. To succeed in this project, the knowledge and experience gained during a Ph.D. was, for me, absolutely vital; I had the ability to review the relevant literature in order to work out *what* to model, and the technical skills to determine *how* to model it.

Clearly for anyone with a quantitative background, a job in finance is always an option, and so after a year and a half at Porton Down I moved to the City. Since October I've been working for Lloyds Banking Group, joining the Capital Modelling Team at an exciting time – over the next year we will be working to develop a sophisticated approach to improve the measurement and management of operational risks affecting the bank. Learning about how risks can be modelled using O.R. has been fascinating and I'm really enthusiastic about putting the model into action with my colleagues.

So what do I want to get across here? Well firstly that O.R. is a discipline spanning a vast number of applications, meaning plenty of scope for exciting career opportunities. In the coming years this is no doubt set to continue with the rise in big data analytics. Variety can also be found in the breadth of techniques that can be applied. Working on different projects across different sectors offers both the opportunity to widen and deepen O.R. skills in the toolkit. And where will I end up? It's hard to say - as long as I'm in O.R. it could be doing anything!

Richard is speaking about the research undertaken during his Ph.D. at the Beale Lecture on February 27th at the Royal Society in London. For any correspondence he can be reached at richardwoodgb@hotmail.co.uk.

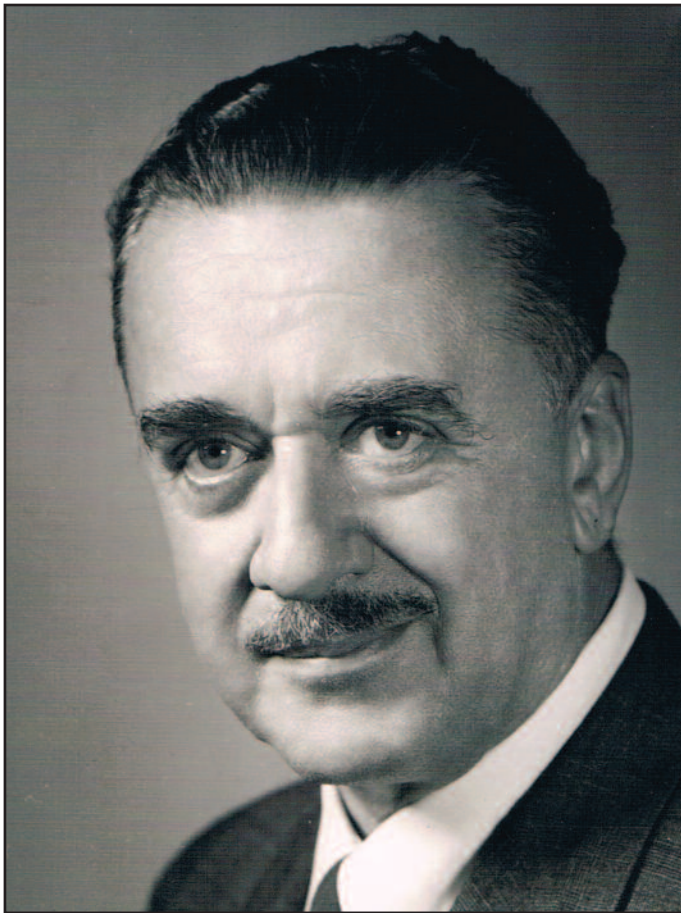
<OR>

'For anyone who has developed a real interest in O.R. and has a passion for learning more, a higher research degree should be a consideration.'

PIONEERS OF O.R. - PHILIP McCORD MORSE

NIGEL CUMMINGS

The name, P.M. Morse, appeared in a recent article about the Earl of Halsbury when it was stated incorrectly that he was an ex-president of the OR Society. In fact he was the first president of the Operations Research Society of America (ORSA) in 1952 and was subsequently awarded the OR Society's Silver Medal in 1965.



P.M. Morse

He was born on August 6, 1903 in Shreveport, Louisiana, U.S.A. and graduated from Lakewood High School, Lakewood, Ohio in 1921. After graduating from Lakewood, he was accepted by the Case School of Applied Science where he graduated in physics in 1926. Dayton Miller, then one of the country's great physicists and head of the Physics Department at Case suggested that Morse apply for graduate admission and a fellowship to three universities: Chicago, Harvard, and Princeton. Although accepted by all three, he decided to pursue his doctorate at Princeton.

At Princeton he worked under the physicist Karl Compton and became attracted to theoretical explanations and devising new models to explain illogical phenomena or puzzling discrepancies between experimental results and theory. His early fascination with model building seems to have started when the field measurements of gas discharges were not supporting the small amount of theory that was then available for atomic plasmas. He combined his knowledge of electrostatics with new developments in statistical and Quantum theory of atomic ionisation; he and Compton were able to publish one of the earliest papers on this subject in 1927.

This and a list of other gas discharge problems puzzled Morse and he continued to incorporate new theory and improved models that might explain the experimental observations. This led to the publication of four papers on electron discharges in gases, now known as plasma physics. One of these papers was accepted for his doctoral dissertation in 1928 and Morse received his Ph.D. in 1929.

From 1930 to 1931, he was granted a Rockefeller Fellowship to study and do research at the Ludwig Maximilian University in Munich under the direction of Arthur Sommerfeld. Afterward he visited Cambridge University in the spring and summer of 1931 where he met and worked with the likes of Ernest Rutherford, Peter Fowler, Julius Stratton, and P. M. Blackett.

Morse recognised the importance of integrating operational policies with technology and felt that the key to effectiveness lay not just in designing improved hardware, but also in understanding how best to organise and make better use of existing equipment – a typical O.R. approach. He later accepted a call from Washington, D.C. to recruit and direct a team of civilian scientists who were asked to study and recommend actions on anti-submarine warfare. The U.S. Navy command hoped to duplicate the success of the naval O.R. team started in the U.K. under P. M. Blackett.

Morse was responsible for organising the Anti-Submarine Warfare Operations Research Group (ASWORG), later ORG, for the U.S. Navy early in 1942. 'That Morse's group was an important factor in winning the war is fairly obvious to everyone who knows anything about the inside of the war,' wrote historian John Burchard. Dr. Morse co-authored *Methods of Operations Research*, the first O.R. textbook in the U.S., with George Kimball based on the Navy work. His further writings include the influential books 'Queues,

Inventories', and 'Maintenance and Library Effectiveness'. He received ORSA's Lanchester Prize in 1968 for the latter book.

His continuing interest in military O.R. led him to propose the formation of the Weapons Systems Evaluation Group (WSEG) in 1949, a group that he led as its first chief civilian. He served as president of the American Physical Society, president of the Acoustical Society of America (ASA), and board chair of the American Institute of Physics. In 1946, he was a recipient of the Medal for Merit from the U.S. President for his work during the war. He gave the opening address at the 1957 organising meeting of the International Federation of Operational Research Societies (IFORS). In 1959 he chaired the first NATO advisory panel on O.R. In 1973 the ASA awarded him the Gold Medal, its highest award, for his work on vibration.

In his autobiography he wrote, 'A corporation should not have the right to deplete irreplaceable mineral resources or to damage irreversibly our environment. A city should not be allowed to foster segregation and pollution by its tax and zoning laws. A country should not have the right to reduce another country to poverty and starvation just to increase temporarily its own citizen's standard of living—or merely their dream of omnipotence.'

Philip McCord Morse (August 6, 1903 – 5 September 1985)

<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.

Melissa Goodman

Cardiff

Elena Pershina

Edinburgh

<OR>

NEWS OF MEMBERS

The Society welcomes the following new members,

A special welcome to BODHIBRATA NAG in India, who joined the society in October.

DAVID DAI, West Yorkshire; PADMA RAJESWARI MUTHIAH SUBBIAH, Surrey; SHAHRIAR SAGHRI, Essex;

and Reinstated members,

and the following student members,

CATHERINE HOBBS, Derbyshire; KAROLA JEHODEK, Glasgow; SALLY THOMPSON, Argyll;

Total Membership
2315

<OR>

SPECIAL INTEREST GROUPS

ANALYTICS NETWORK

CONTACT Sayara Beg

EMAIL: ANChair@theorsociety.com

A World of Financial Data at your fingertips, Strongly Tooled and Strongly Typed

Date/Time: Wednesday, 29 January 2014 at 16.00

Venue: University College London

Speakers: Don Syme, Principle Researcher, Microsoft Research Inaugural seminar of the UCL Financial Computing and Analytics Group, supported by the Analytics Network of The Operational Research Society.

The format will be speaker; Don Syme from Microsoft Research presenting, followed by a Q&A session and finishing with a networking session.

Register to attend via this MeetUp link: <http://meetu.ps/27KpqF>

For more details, please reach out to the organiser: Dr Antoaneta Serguieva, UCL Senior Fellow
a.serguieva@ucl.ac.uk or +442031081063

March Networking Event

Date/Time: Thursday, 27 March 2014 at 18.00 till 22.00

Venue: TBC

Speakers: TBC

Developments in Advanced Analytics and Big Data

Date/Time: Wednesday, 30 April 2014 at 09.00 till 17.00

Venue: BMA (<http://bma.org.uk>)

Speakers: Sayara Beg (A.N. Chair), Don Kleinmutz (INFORMS), Alan Hambrook (Zoral Outsourcing), Arne Strauss (Warwick University), Dan Kellett (CapitalOne)

Big Data & Analytics Stream at SCOR 2014

Date/Time: Friday, 02 May 2014 at 09.30 till 15.30

Venue: University of Nottingham

Speakers: Michael Mortenson

I am currently involved in helping set up the 4th SCOR (Student Conference on Operational Research) conference (www.scor14.com) to be held at the University of Nottingham in the first May bank holiday of next year (2nd-4th May 2014). The conference is aimed at PhD students and young practitioners at the start of their careers and covers a wide range of topics and streams.

As one of which I am chairing a Big Data & Analytics stream and would welcome abstracts from anyone interested in presenting on a wide range of topics across the analytics spectrum including:

- Big Data applications
- Predictive analytics
- Machine learning
- Data science
- High-performance computing
- Text analytics & natural language processing
- Any presentations exploring theoretical or practical examples of how OR/MS and analytics can be linked

For members of the Analytics Network we are aiming to deliver a live video stream of the event and/or a downloadable video recording of the presentations. More details to follow.

In the meanwhile for anyone interested please check out the conference website (www.scor14.com) or am happy to give out any information or answer any questions by email (michael@scor14.com).

CRIMINAL JUSTICE

CONTACT: Ian Newsome

TEL. DDI: 01924 292244 **Extension:** 22244

EMAIL: ian.newsome@westyorkshire.pnn.police.uk

Criminal Justice SIG meeting

CJ sig autumn meeting

Date/Time: Monday, 24 February 2014 – 10.30 - 13:30

Venue: Home office, London

We are pleased to announce that at our first 2014 meeting we will have talks from a variety of speakers including: a joint presentation from Alan Jackson of Hants Police and Roy Garlick/Gary Chitan from iGrafx on 'Improving Custody Suite throughput & Criminal Justice Processes'; Ben Strange from the Mayor's Office for Policing and Crime will cover the topic 'Business crime strategy: Overview from the Mayor's Office (and how O.R. practitioners can help)'; Jo Leigh from Loughborough University will speak about her project 'Research into Police demand modelling and predictive positioning' and will seek feedback from the audience; and Alastair Windus from the HMIC will tell us about 'O.R. in Her Majesty's Inspectorate of Constabularies'.

A final programme and timetable will be posted on the CJ sig website asap.

http://www.theorsociety.com/Pages/SpecialInterest/CriminalJustice_future.aspx

Early booking is recommended as space will be tight: suemerchant@hotmail.com. Joining instructions and a final programme will be sent to all those booking. As usual please bring your own refreshments.

THIRD SECTOR O.R.

CONTACT: Katherine Byrne

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Unlocking the Value of Data for Charities and Other Voluntary groups

Date/Time: Wednesday, 26 March 2014 at 15.00 - 20:00

Venue: 15 mins walk from London Bridge station, tba.

Speakers: Mat Ilic, Colin Stewart and Tracey Gyateng

With the advent of fast computers and the internet, the total amount of world data is forecast to grow 50-fold in the next decade, yet only 1% of this data is currently used productively.

This event will explore how charities and voluntary groups can use data to improve their impact and make better decisions.

Our speakers will describe their real life experiences of using data and demonstrate the benefits that effective data analysis has brought to their organisations. The list of speakers includes:

Mat Ilic is the Policy and Research Director of Only Connect. Mat will talk about how to use data analysis to produce useful evidence in charities. Colin Stewart is a consultant Analyst at Caversham Analytics. Using maps of data and analysis to support local decision making using quantum GIS and Microsoft Excel. Tracey Gyateng is the Project Manager for NPC's 'Data for Impact' stream of work.

Tracey will talk about Increasing access to government administrative datasets to measure the impact of the voluntary and community sector.

To book your place please e-mail John Holt at jholt@danielholt1992.com

O.R.-NOW

JOHN CROCKER

Hyper-heuristics!



Edmund Burke

One of the problems with search methodologies, especially those using heuristics, is knowing which to use for a given situation. Having made a decision, even if it is the correct one, the next task is to determine the best values of the parameters to use to ensure success. This is not a new problem – see O.R. – 30 (ibid) but it is a growing one as the number of potential algorithms increases. What practitioners, particularly those without any formal O.R. training, require is a ‘robust’ optimisation method – one which will work for all situations. Whilst this is currently unrealistic, nonetheless hyper-heuristics might be able to provide a means of automatically selecting a suitable method from amongst a portfolio of potential methods.

Hyper-heuristics refers to a search method or learning mechanism capable of selecting or generating heuristics to solve computational search problems. Two main hyper-heuristic categories have come under the news spotlight, they are: heuristic selection and heuristic generation.

The distinguishing feature of hyper-heuristics is that they operate on a search space of heuristics (or heuristic components) rather than directly on the search space of solutions to the underlying problem that is being addressed. The review paper, ‘Hyper-heuristics: a survey of the state of the art’ notes that several communities have been investigating these problems with similar goals but, as yet, there has been little interaction between them. Indeed, this paper references over 200 published papers so there would appear to be no lack of research activity.

Even if you are not particularly interested in using a heuristic method, this paper provides a fascinating list of problems that can be solved by various approaches which incorporate varying amounts of learning and feedback. Against each of these, there are descriptions of the problem and methods/approaches used to find solutions.

This, in itself, is a most valuable source of reference. In particular, it groups together the types of problem which can be solved using a given approach. For example, production scheduling, educational timetabling, 1-D packing, 2-D packing and cutting, workforce scheduling, constraint satisfaction and vehicle routing are all listed under the heading ‘Approaches based on constructive low-level heuristics’. Against each of these and those in the second table (using perturbative low-level heuristics) is a description of the problem and of some of the algorithms used that have proved successful.

Most of these problems can be categorised as NP-hard, meaning that whilst, in general, they can be solved theoretically by carrying out an exhaustive search, in practice such an approach becomes too time-consuming to be practical as the size of the search space increases.

Burke, Edmund K., M. Gendreau, M. Hyde, G. Kendall, G. Ochoa, E. Ozcan and Rong Qu, (2013) Hyper-heuristics: a survey of the state of the art, *JORS* 64.12, Pp 1695-1724

<OR>

REGIONAL SOCIETIES

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

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

O.R. IN SCHOOLS (ORIS)

LOUISE ORPIN, EDUCATION OFFICER

Whenever the ORiS Taskforce meet, we consider ways in which we can measure the impact that the programme is having. In one of my original articles about the direction that I thought ORiS could go, I felt that teachers were the key to us meeting our challenging goal that 'all school children would know what O.R. is'.



By raising awareness of O.R. with teachers they are able to use our resources and provide careers information to each subsequent cohort of students. Making a conservative estimate, I believe that over the last 3 years the ORiS programme has reached at least 500 teachers and one can only imagine how many more students have benefited from their teachers' knowledge of O.R.

There are many channels through which teachers are made aware of O.R., they include: subject specific conferences for maths teachers

such as those organised by MEI, the MA and ATM; CPD events organised by the Further Maths Support Programme (FMSP); our LearnAboutOR website; Maths PGCE courses; the DVD and videos on YouTube; twitter; Google+; and school careers fairs and visits.

The OR Society has also become a valued stakeholder in the mathematics education community and as such our resources are readily promoted by the FMSP, MEI, nrich, mathscareers.org and the National STEM Centre with their networks of teachers. The teachers I meet are always interested to find out about O.R. and some have even asked about a career change, wishing they knew about O.R. when they were at school or university.

We are always looking at how we can extend the reach of ORiS and we have two exciting developments planned for 2014. They are the development of our school visit volunteers which will include workshops and more supporting materials to develop our volunteers that go into schools, and the O.R. Ambassadors in Schools (ORAiS) project that was initiated as a charitable project will now become part of the ORiS programme. ORAiS started as a pilot with Cardiff University and University of Greenwich placing undergraduate students into local schools to develop teaching resources. We are now looking to develop the project so that more schools and universities can get involved. There is a demand for undergraduates to work with local schools so this is an exciting time to be supporting O.R. students to get involved with maths lessons.

As always, please get in touch if you'd like to know more or get involved in any way, louise.orpin@theorsociety.com.

<OR>

SPECIAL INTEREST GROUPS

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

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

SOCIAL MEDIA AND THE OR SOCIETY

LOUISE ORPIN, EDUCATION OFFICER

You may or may not be aware that the Society is developing its social media campaign and thanks to the Social Media Working Group, chaired by Frances Sneddon from Simul8, we now have a presence on Twitter, LinkedIn, Google+ and Facebook.

Each member of the group has taken responsibility for a particular platform. Frances has taken the reigns for Twitter, Vince Knight is developing our presence on Google+ and Aidan Cross is developing our Facebook page. The LinkedIn group is already well established.

Please take a look at what we've been doing, you can find links to Twitter, LinkedIn and Facebook on our website, www.theorsociety.com/Pages/Networking/FollowUs/FollowUs.aspx. Our Google+ page can be found here, plus.google.com/+Theorsocietypage.

Social media allows people to interact in virtual communities and networks in which they create, share, and/or exchange information and ideas. The content is user generated and you decide what you want to see. Most people tend to use only one or two platforms so have a go and see which one suits you best. Take this opportunity to meet new people and learn new things, share your thoughts and raise your profile, or just to keep up to date with the Society's activities.



If you're new to social media and would like some help getting started or have anything to share with us then please get in touch with the social media group, social@theorsociety.com.

<OR>

HUMOR COLUMN

GAVIN BLACKETT, SECRETARY & GENERAL MANAGER

A short contribution of my own this month...

A magician worked on a cruise ship. Since the audience was different each week he did the same tricks over and over again.

There was one problem. The captain's parrot watched the show each week and began to understand how the magician performed each trick.

Once he understood he started shouting out in the middle of the show, 'Look, it's not the same hat!' or, 'Look, he's hiding the flowers under the table!' or, 'Hey, why are all the cards the ace of spades?'

The magician was furious, but there was nothing he could do. After all, it was the captain's parrot.

Then one stormy night on the Pacific the ship unfortunately sank,

drowning almost everyone who was on board.

The magician was one of the lucky ones who survived and found himself floating on a piece of wood in the middle of the ocean...as fate would have it with the parrot.

They stared at each other with hatred, but neither uttered a word.

This went on for a day...then another day...and a third day. Finally, on the fourth day the parrot could not hold back any longer and said...

'Okay, I give up. Where's the ship?'

<OR>

MONEY, MONEY, MONEY!

NIGEL CUMMINGS

According to an article published on 7 Jan 2014 in the Guardian newspaper, Dstl, part of the MOD, is sponsoring PhD papers concerning hacker culture, crowd behaviour and social networking sites.

In particular, it is interested in the culture of computer hackers, crowd behaviour at music festivals and football matches, and the impact of Twitter, Facebook and online conspiracy theories in times of crisis.

The Guardian also reports that Dstl is hosting an invitation-only conference focused on 'social influence in the information age'. A PhD project funded by Dstl at the University of Exeter is for 'Collective Action in the Digital Age: Social identities and the influence of online and offline behaviour'. This follows from the events of the Arab spring, the London student protests and the summer 2011 riots in English towns and cities which showed the importance of understanding synchronised collective actions driven by online interactions. The project also aims to deliver new and innovative ways to understand and influence online behaviour.

Another Dstl funded PhD programme at Queen Mary, University of London, is 'Analysing and influencing crowd behaviours through arrays of ad-hoc mobile sensors'. Mobile sensors typically include the digital compasses that can be used to identify the location of the user. The contract for the PhD paper states: 'The PhD student will gather large-scale datasets from a variety of different mass crowd events, such as music festivals, sporting events, etc'. It also adds that the research will 'provide essential tools for event planners and event monitors for wide ranges of events, planned, such as festivals, football matches, and political rallies'.

Other PhDs benefiting from military financial aid include: 'Achieving legitimacy in a new media ecology' (University of Glasgow); 'Data mining to understand international dimensions to online identity – a classification of 2+ billion names and their linkage to virtual identities and social network traffic' (University College London); and 'Social movement 2.0: collective identity in the era of online participatory media' (Kings College London).

Whilst on the subject, as part of the System Approaches to Distributed and Embedded Architectures (SADEA) project, EPSRC is funding a University of Glasgow project to tackle 'manycore computing challenges'.

Researchers at the University of Glasgow have started work on new projects which aim to unlock the potential computer processors and could contribute to applications including more accurate weather predictions, improved robot explorers and cross platform application porting. Most computers and many other devices contain more than one processor. Many of these are very much

under-utilised and hence could be a valuable source of processing power for very large-scale projects.

One project, led by Dr Wim Vanderbauwhede, will focus on creating a software 'Rosetta Stone' to allow existing computer programs to harness manycore system processing without requiring programmers to rewrite their code from scratch. Over the next five years, Dr Vanderbauwhede and his collaborators at Imperial College London and Heriot-Watt University will develop a compiler system to allow programs to take full advantage of manycore systems. The project could assist with complex computational tasks such as weather forecasting.

Dr Jeremy Singer aims to develop 'AnyScale' technology which will allow applications to intelligently distribute their computational requirements across a wide range of local and wirelessly-connected hardware. The first project will support development of a movement controller app to allow a bipedal robot to traverse a wide range of terrain.

Professor Phil Trinder is hoping to develop a reliable method to ensure the performance of software is consistent across a wide range of multicore or manycore systems, from desktops to high-end supercomputers.

<OR>



THE PUBLIC SECTOR SCORECARD – A CASE STUDY ON REDUCING OBESITY

MAX MOULLIN DIRECTOR OF THE PUBLIC SECTOR SCORECARD RESEARCH CENTRE

Performance management in the public and voluntary sectors is of increasing importance in today's economic climate. A key question is how do we ensure that services meet the outcomes required.



Sheffield Let's Change4Life – Overall Strategy Map

Sheffield Let's Change4Life (SLC4L) - a three year £10 million programme – is aimed at reducing obesity in children and families. Obviously the team could not force people to change their behaviour. So how could they help them make the changes required? Secondly, if there was a reduction in obesity in the city, how would we know which, if any, of the programme's activities were likely to be responsible?

The Public Sector Scorecard is an outcome-focussed service improvement and performance measurement framework which extends and adapts the balanced scorecard to fit the culture and values of the public and voluntary sectors. As with the balanced scorecard, a key output of the Public Sector Scorecard is the strategy map which was developed following separate workshops with the programme board, operational managers and Sheffield Youth Council.

The strategy map was used both to help focus on the desired outcomes and, to monitor and evaluate performance. When evaluating a workshop on diet and exercise provided for workers at a Sheffield steel manufacturer there was quite positive feedback on items C1 and C3. However one senior manager commented that the company did not have space for a canteen on site - but there was a convenient mobile burger bar parked outside the factory gates every lunchtime! Clearly, unless that particular barrier is

overcome (item C4) one workshop was unlikely to lead to a significant change in obesity levels of workers or their families.

Paying attention to cause and effect – an everyday concern of O.R. and analytical professionals – proved crucial in providing the insights required. Carol Weir, SLC4L programme director, commented:

The SLC4L Strategy Map was a very useful tool in terms of explaining and evaluating the programme. It visually told the story of SLC4L, what we were trying to achieve and how. It also helped all those involved understand the outcome and process measures the programme was trying to achieve, and therefore being evaluated against. It provided an 'At a Glance' understanding of SLC4L.

To find out more there are still a few places at the OR Society Training Workshop on Improving Quality and Performance with the Public Sector Scorecard in Birmingham on March 18th. For further information visit <https://www.theorsociety.com/Pages/Training/Courses/2014/295.aspx>

This is an interactive workshop facilitated by Max Moullin, director of the Public Sector Scorecard Research Centre. Max is a Fellow of the OR Society and the Chartered Quality Institute and a member of the national Public Sector Performance Management Forum and the Healthcare Advisory Forum.

<OR>

'The strategy map was used both to help focus on the desired outcomes and, to monitor and evaluate performance.'

WOLFRAM'S NUMERICAL ANALYSIS MIDDLEWARE

NIGEL CUMMINGS

A new data language transfer driver may assist analysts looking to streamline operations concerning their input, integration and analysis from a wide number of data sources.

Last year Wolfram extended its mathematical analysis tools so they can be used by portable device manufacturers to offer interactive data to their users. This year's launches are: a set of 'middleware' application options that it hopes will serve as the 'Lingua Franca' for the so-called 'Internet of Things'; the Wolfram Data Framework (WDF) which can serve as a bridge between data collecting electronic devices and desktop or cloud-based analytical services, and; a directory of consumer and industrial devices that use this new framework called, the Wolfram Connected Devices Project, which compiles the characteristics and specifications of each device in a structured database so they can be easily searched and compared.

The new Wolfram set of tools brings two distinctive advantages to the market, both of which come from the company's extensive work on Mathematica. One of these advantages is the provision of access to the company's vast library for handling physical quantities and their units of measurement. The company since its inception has compiled nearly 10,000 units of measurement, covering almost anything and everything that any device could possibly keep track of, such as length, time, acceleration, torque, or tensile strength. All of these, have been made available in a wide variety of scales.

These measurements are all encapsulated in the company's WDF product too, which according to Wolfram, 'will provide an immediate way to represent not just raw numbers from the device, but, images or Geo positions – or actual measured physical quantities.' Device manufacturers and computer users who wish to take advantage of the analytics capabilities of WDF, will need to install a language driver on each device though, but this driver delivers the low level data to the WDF, which in turn is converted into more sophisticated data to structures. All of which can be utilised for further analysis.

Once converted, the data can then be run on local computers or as a cloud service by the device manufacturer. This technology could be particularly useful in hospitals where it will aid the compilation of patient data from a variety of WDF enabled diagnostic instruments. To have all the information compatible and in one location as a result of this integration could be very useful to medical practitioners.

Wolfram is also working with Intel to develop a version of the Wolfram language for Intel's Edison Project. The 'Edison' is an embeddable computer the size of an SD flash storage card. Wolfram expects the Edison, which Intel announced at CES, to be integrated and utilised in a wide range of portable devices during 2014 and beyond.



The Wolfram Connected Devices Program will serve as a directory of devices that could support their WDF. So far the company has compiled basic entries on a few thousand devices, and these include such mundane objects as kitchen scales, sport watches and GPS devices. Overall, products from around 300 different companies are represented in the database currently. With the increasing use of remote sensor technology to gather data in and around the world we live in, Wolfram's language driver could be one of the most useful tools to date, to pack into the Analytic Expert's box of tools!

<OR>

'The company since its inception has compiled nearly 10,000 units of measurement, covering almost anything and everything that any device could possibly keep track of, such as length, time, acceleration, torque, or tensile strength.'

ONWARDS AND UPWARDS

NIGEL CUMMINGS

Predictive Analytics Market, a report published by Transparency Market Research, forecasts the predictive analytics software market will reach US \$6.5 billion globally by 2019.



The growth in this area of analytics is apparently due to increased demand for 'customer intelligence' and efficient 'fraud and security intelligence' software. Cloud-hosted predictive analytics software solutions are also seen as an emerging market and expected to drive growth in the near future.

Globally, the predictive analytics market was valued at US \$ 2.1 billion in 2012 and this is expected to grow at 17.8% per annum. Banking, finance services, insurance, government, pharmaceuticals, telecom and IT, and retail are seen as key demand drivers during the forecast period - collectively these segments accounted for 71.8% of the market share in 2012.

Banking, finance services, and the insurance sector are expected to account for the largest market share throughout the forecast period, but retail and manufacturing, are expected to achieve a faster growth rate. This is probably due to fast growing consumer driven digital data and the subsequent need to extract strategically critical information.

The rise in incidences of frauds, payment defaults, over or under stock inventory levels, and stringent regulations regarding governance, risk, and compliance, have also pushed companies to adopt predictive analytical models, so they can gain better insights into the effects of risk and potential for fraud and take preventive measures.

In software markets there appears to be an ever increasing demand for industry specific software concerned with customer intelligence, fraud, security intelligence, and campaign management. These sectors account for approximately 50% analytics software market revenue for 2012. Many different software solution types are used for supporting organisational functions/applications such as sales and marketing, customer and channel management, operations and workforce management.

Software solutions for finance and risk management accounted for 40.9% of revenue share in 2012, demand has surged amidst the restraining impact of current global economy, where companies have been looking for measures to more efficiently manage their finances and associated risks.

The report also indicated that most of the analytics software solutions purchased were delivered through on-premises installation, and such installed solutions alone accounted for more than 75% of revenue share. Demand from companies with strong financial arms has been a key contributor. However, with rise in awareness of the power of predictive analytics, demand has risen from small and medium businesses. Increasingly companies are adopting cloud-based predictive analytics software solutions and such services are expected to emerge as an alternative, low-cost resource which offers scope for upgrade.

North America, has been at the forefront of generating big data in large quantities, and this region is expected to remain the largest market for predictive analytics software solutions. This is due to demand for advanced business intelligence being directly affected by the need for large organisations to analyse big data.

Use of the predictive analytics aspect of business intelligence has seen a revival ever since big data gained popularity and has been growing exponentially. As a result, big data vendors too have been entering the market for predictive analytics, making the competition intense.



ARE UK COMPANIES MISSING A TRICK?

NIGEL CUMMINGS

Despite almost worldwide adoption of the data analytics and cloud computing, companies in the United Kingdom appear to be resistant to adopting their own big data analytics systems.



Data storage and analytics company EMC recently undertook a survey amongst nearly 500 UK IT decision-makers as part of its research programme and found that while 75% of respondents reported that decisions in their company could be improved with a better use of data, only 37% of those who responded, agreed that their senior teams trusted big data insight sufficiently to make transformative business decisions.

EMC's research also revealed that only 21% of UK companies have achieved a competitive advantage as a result of big data analytics technology adoption, 44% of companies thought it would be a key to success and 37% agreed that big data technology was likely to prove vital for those companies wishing to identify and protect against cyber-attack.

The survey and research also indicated that UK companies are far more likely (62% in fact) to use external third-party companies to gain insight into their business intelligence, these are reported as peers, partners and industry bodies. The most common reason given against the use of big data was 'no clear business case or proven ROI'.

This survey amongst British companies, despite its negativity among respondents about big data, did show however that, in the UK, companies are increasingly seeing the transformative benefits that are achievable with big data analytics technology. It is merely unfortunate that the adoption of such technology seems to be lagging behind compared to the rest of the world.

The survey also revealed that 68% of UK companies had active plans in place to implement big data technology at some future point, and this compares favourably with other results from across Europe. The EMC survey included among its respondents, IT management, executives, technical architects, data scientists and storage/infrastructure managers from a wide range of UK businesses.

The survey and research also found that demand for the skills necessary to fully make use of big data will outpace supply within five years. This was supported by 64% of the respondents.

In addition to citing lack of confidence in the business transformation benefits of big data analytics the survey also revealed that many of the respondents said barriers to data science adoption were due to lack of skills or training (32%), budget resources (32%), the wrong organisational structure (14%) and lack of tools technology (10%).

Overall the survey and research undertaken reveal some surprising opinions from business intelligence analysts, only 38% of them for example, 'strongly agreed' that their companies should use data to learn more about its customers.

These might indicate that there is an opportunity for O.R. professionals to 'push home' the benefits associated with both the adoption of O.R. practices and the utilisation of big data analytics technology.

<OR>

'The most common reason given against the use of big data was 'no clear business case or proven ROI.'

O.R. AND ANALYTICS IN CONSULTANCY

NIGEL CUMMINGS

At our Careers Open Day held at Birmingham's 'ThinkTank' in 2013 Michael Nicholson, IBM talked about the implementation of IBM's 'Try Tracker' for the Rugby Football Union (RFU).



Michael Nicholson

Try Tracker was part of the company's intention to build on technology used at Grand Slam tennis tournaments that provides spectators with on-line, real time information about the state of play. Essentially, it aggregates a lot of data under three headings: keys to the game, momentum and; key players. These three keys could help depict game factors such as success rates in winning lineouts, rucks, loose scrums or kicks at goal.

The application of analytics to RFU could also give the public a better understanding of nontrivial scoring and remove the confusion of the phases of play in the game. Analytics he said, could make good use of that time span where people actually interact with the game, it could help drive engagement.

'Our target audience', he said, 'were people who really didn't understand rugby that well, but we felt their appreciation of the game came down to understanding how and why which team was winning and analytics could answer the question. Was it possible to give a real-time indication of which team was doing better 'during' a game?'

In any typical game there were between 1500 and 2000 events such as tackles and tries that could be tracked and graphed. Analytics technology could collect, convert, and display these events as momentum by scoring each event with a score based on when,

where, and how it took place during the game. Plotting these 'momentum points' shows the ebb and flow of the match.

To illustrate the use of the momentum graphing, Mike Nicholson showed a slide which depicted events taking place during the 28th minute of a recent game between England and the New Zealand All Blacks when England won a penalty after achieving a great deal of game pressure and eventually scoring a try. Such 'turning points' are the great moments of the game. Using real-time analytics to depict them to the audience could greatly enhance their enjoyment of the game they were viewing. In addition, a record has been kept of the events which took place within the game which could be subjected to further analysis later and used to improve team strategy for future games.



IBM RFU rugby trytracker key players

Analytics in the case of the RFU and many other competitive sports could be utilised to show which players were having the greatest impact too. For those of us who were unsure as to whether or not the Try Tracker analytics solution from IBM was accurate, Mike Nicholson presented another slide which show the results of the Try Tracker analysis against the actual recorded events and outcomes of typical game – Try Tracker did very well indeed, and proved an excellent example of how analytics could be applied to competitive sports.

REGIONAL SOCIETIES

MIDLAND (MORS)

CONTACT: Jen East (Secretary)

EMAIL: MidlandsORSociety@live.co.uk

PhD research showcase

Date/Time: Tuesday, 28 January 2014 at 18.00 – 19.30

Venue: Lecture Theatre M2, Warwick Business School Teaching Centre, University of Warwick

Speakers: Mahdi Noorizadegan and Chenlan Wang

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

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

Abstract: In this seminar, we summarise popular modelling and solving techniques to deal with vehicle routing problems with uncertain demands within a priority policy. Vehicle routing problem with uncertain demands is concerned with finding a set of routes which are valid and optimise an objective function. The definition of the valid routes and the type of objective functions play an important role in selecting modelling techniques within stochastic optimization and solution methods within integer programming. In this seminar, we briefly present two robust optimisation approaches and two stochastic programming techniques to model our problem.

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

Abstract: In a transportation network, each traveller chooses a cheapest path selfishly, but this may cause inefficiency from a system perspective. Price of anarchy is used to measure how inefficient the system is due to travellers' selfishness, by comparing two assignments: user equilibrium and system optimum. For user equilibrium, each traveller aims to maximize the individual utility at a cost of whole system efficiency. For system optimum, all the network resources are well organized and assigned in the most efficient way. We generalize the notions by considering the fluctuation of traffic demands from day to day. The upper bounds of the price of anarchy with affine cost functions and polynomial cost functions will be presented in this talk.

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

Abstract

The purpose of this research is to provide a decision-support system for flood preparedness and response based on the use of optimization and geographical information systems (GIS). The GIS includes specific characteristics of floods to assess the situation, whereas optimization is used to find the best location for emergency facilities, the allocation of pre-positioned stock and the

distribution policy based on the results of the GIS.

The value of this research is to show the applicability of these components for developing an useful tool for flood management in Mexico, aiming to provide reliable solutions to improve disaster operations.

Modelling and measuring demand and performance in HMRC call centres

Date/Time: Wednesday, 26 February 2014 at 18.30

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

Speakers: Steve O'Donnell, HMRC

Abstract

The management of call centre performance relies heavily on queuing theory work first carried out by Erlang in the early 20th century and much elaborated since. But this approach requires copious and detailed forecasting of future demand and resources and while it is excellent for short term performance management HMRC has found it less suitable for medium to long term performance planning of their call centres. Part of the problem, which any call centre under pressure faces, is it is difficult to establish how much demand the call centre has to handle. The work described here outlines a novel way of measuring the real demand faced by a call centre. This measure turns out to be intimately related to the performance of a call centre and allows the building of extremely accurate models of medium to long term call centre performance.

Optimising the Retail Network for New Zealand Post

Date/Time: Wednesday, 02 April 2014 at 18.30

Venue: TBA

Speakers: Tony Lewins, Ernst & Young

Abstract

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

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

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

The project provided NZP with a model that optimises the retail network under any specified conditions. It also allows them to investigate scenarios for the future, including the introduction of

new types of outlet, new products and future business volume assumptions. It accommodates operational, financial and social constraints.

Winner of the 2013 President's Medal

A model future for the UK's nuclear legacy

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

Venue: TBA

Speakers: Panos Frangos and Simon Hughes

Details to follow

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

SCOTLAND (ORGS)

CONTACT: Kerem Akartunali (Chair)

EMAIL: Kerem.Akartunali@Strath.ac.uk

CONTACT: Roberto Rossi (Secretary)

EMAIL: roberto.rossi@ed.ac.uk

The Relationship between Retail Marketing and Logistics: Fulfilling Consumer Demands in a Changing Retail Space

Date/Time: Friday, 07 February 2014 at 14.00

Venue: Conference room, 29 Buccleugh Place, Edinburgh, EH8 9JS

Speakers: David B Grant

The desired output of logistical activities is to provide goods and services to consumers to meet their needs from 'point-of-origin to point-of-consumption' and is akin to the desired output of the marketing concept. However, the reality is that logistics and marketing seldom meet, particularly at the critical retail interface between firms and consumers.

This seminar will reflect upon a decade's research of logistics customer service in the retail sector to present a current appreciation of the strategic connections and disconnections between retail logistics and retail marketing or merchandising. Current examples of the foregoing issues will be reviewed before observations are provided about what retailers as well as marketers should do in future. The seminar will conclude with some brief alternative and unpopular points of view to the somewhat fractious relationship between consumers, retailers/marketers and logisticians, including reducing product ranges, increasing road infrastructure to ease traffic congestion, charging the full cost of products and services for both in-store and home delivery provision, and educating consumers regarding wastage incurred from over-consumption.

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.

TEL: 029 2087 5524 Fax: 029 2087 4199

EMAIL: ThompsonJMI@cardiff.ac.uk

Dates for your Diary

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

YORKSHIRE & HUMBERSIDE (YHORG)

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

Date/Time: Wednesday, 29 January 2014 at 17.00

Venue: West Yorkshire Playhouse, Leeds

Speakers: Stewart Robinson, Dr Natasha Shakhlevich

How do you Solve a Problem like Analytics?,

Stewart Robinson

Professor of Management Science, Loughborough University
President of the OR Society

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

Theoretical and applied aspects of enhanced scheduling models, Dr Natasha Shakhlevich

Senior Lecturer, School of Computing, University of Leeds

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

OR-30

John Crocker

Heiner Müller-Merbach gave the closing plenary session at EURO VI (July 1983, Vienna, Austria) in preparation to IFORS X which was due to take place in Washington DC in the August of 1984. In his presentation he talks about the importance of a multi-disciplinary approach and the benefits of creating multi-disciplinary O.R. Groups.

Almost all of the early O.R. Groups were multi-disciplinary drawing people from various backgrounds. Although most would have had a degree in 'STEM' subject, it was not unknown or particularly uncommon to find people with an 'arts' background. By the early 1980s there were many post-graduate courses in O.R. but as I recall, not many first degree courses.

There are according to Heiner, two major problems to achieving interdisciplinarity: mutual appreciation and; a means of communication. He explained that everyone has their own very narrow view of the world dependent on their educational background. At the same time, they will have learnt the language (and jargon) associated with that view and, as such, will generally find it very difficult to communicate in a meaningful way with people from different disciplines. There is also a tendency for people to consider those from other disciplines as in some way inferior or superior but, either way, unapproachable.

With all [O.R.] problems, especially real-world ones (referred to by Ackoff as 'messes') it is essential to take as many different views and approaches as possible. What may be the optimal solution for one party will, almost certainly, not be acceptable, even as a feasible solution, by others.

In the second reference, Hanif Sherali and Minerva Rios consider the problem of crew allocation and scheduling as applied to the US Air Force (USAF). I have chosen this one because of its relevance to another article this month which looks at 'hyper-heuristics'. The basic problem is to devise a timetable and crew roster such that the m routes each starting at the home base and passing through some subset of the n bases is flown the required number of times during given period (typically 90 days). The problem is to maximise the average utilisation rate for the aircraft.

There were two variants of this problem. In the second variant of the problem, there was a requirement that there was a minimum time interval between any two flights along the same route. In the first variant, this restriction was not applied which could, theoretically, result in all the flights along a given route being flown concurrently (given there were sufficient aircraft).

Two alternative algorithms were used on both variants of the problem. 'The results indicate that each one of the two methods is preferable to the other for one of the two variants of the problem.' This is where there is a link with the article on hyper-heuristics. Given there are m types of optimization problem and n possible algorithms, is it possible to derive an algorithm which determines which type of problem one has and which of the n possible algorithms is the best to use to solve it.

Müller-Merbach, Heiner, (1984), Interdisciplinarity in Operational Research – in the Past and in the Future: An Invitation to IFORS '84 in Washington DC, *JORS*, **35.2**, Pp 83-89 (jors198415a.pdf)

Sherali, H. D. and M. Rios, (1984), An Air Force Crew Allocation and Scheduling Problem, *JORS*, **35.2**, Pp 91-103 (jors198416a.pdf)

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From the President

Strengthening the links between industry and academia

One of the consequences of last year's government white paper on science has been a major restructuring of the Research Councils. In particular the remits of all but one (I leave you to guess which) now have a commitment which emphasises the need for research to be related to creation of the nation's wealth. Whatever you may think of the relative advantages or disadvantages of applied directed research viz a viz pure blue skies research, this change means that Research Councils will be more anxious to highlight the usefulness of their sponsored work to UK Ltd. Operational Research has proved one of the more useful research areas for industry and

commerce mainly because of the nature of the subject. Operational Research problems are by definition problems that manager's face and with which they need assistance in deciding what to do. Moreover, the students who graduate from the Research Council sponsored Masters courses in Operational Research have been some of the most highly sought after students by British industry for over twenty-five years. These graduates, not only proved highly motivated and competent additions to the Operational Research groups but were often seen by their organisations as potential 'High Flyers' and were moved onto more general management problems. The combination of problem solving facility, quantitative skills, and ability to see the big picture which Operational Research develops prove invaluable in general management.

One area where the Research Council in this country has been less successful than some others is in getting people changing from academia to industry and back again. Compared with the USA for example, there are far fewer Operational Researchers who have both industrial and academic experience on their CV. The reasons for this are manifold – the culture of the different institutions, the structure of pensions, salaries that are for a whole year as opposed to 10 months – but the result is clear, and probably in the case of O.R. to the detriment of the subject. One of the recognised strengths of Operational Research in the UK has been its close association with real applications, and this must be helped if people are moving between practitioner jobs where they have to get on and solve the problems, and academic jobs, where there is more time to reflect on the choice of decision that might be appropriate.

One way the Research Councils in the past have tried to foster good communication between industry and universities is by providing Industrial Fellowships. These allowed industrialists and academics to work in the other environment on projects of interest to both parties. These projects could be fundamental science or industrial innovation but the awards had to be for a minimum of six months to a maximum of two years. It seemed to me when I was on a Research Council committee that whereas this six month limit was no hindrance for those in the big sciences of physics, chemistry and

biology where research involves large scale experiments using complex equipment, so that even a limited exploration of a problem could easily take six months, it was a deterrent for encouraging collaboration in subjects like Operational Research where the investigation of a problem comes in more manageably-sized chunks and rarely requires more equipment than a good computer. It always seems to me that a similar scheme but with much shorter periods of commitment – a few weeks or a month or two – would prove very beneficial in fostering strong links between academia and Industry. The grant would cover the extra cost involved in someone from either industry or academia working for a short time in the other sector and would help to make the release of people a little easier. The brownie points awarded in academia for research grants would make heads of department more willing to allow O.R. staff to participate while O.R. managers in industry could argue that such a grant was equivalent to buying out the staff member for a period. Education and Research Committee of Council is going to look at this idea, and hopefully a pilot scheme will be in place by the summer of 1994. Any views on how members might see such a scheme being of use to them would be welcome.

Lyn Thomas

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

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