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IFORS NEWS

International Federation of Operational Research Societies

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# Analytics and OR in the UK

**Stewart Robinson**, *President of the OR Society*
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I read with interest Peter Bell's last editorial on the future of IFORS. In it he discusses the rise of analytics and data science (shortened to 'analytics') and how it is fuelling the growth of OR, especially in the USA. I very much agree with the tenor of Peter's comments and wanted to make a few comments from a UK perspective.

Peter notes that 'analytics markets really well in industry.' In the UK we are certainly seeing this trend. Many industry-based OR groups and consultancies are re-labelling themselves with analytics in their titles. The leaders of these groups, who meet regularly under the auspices of the Heads of OR Forum, see this as an imperative to maintain and grow their streams of work.

For the last five years the Operational Research Society has been making efforts to connect with the analytics community, driven by the belief that OR has much to offer. This has led to a number of initiatives, including:

- An annual analytics event in London, now entitled The Annual Analytics Summit. Typically this involves seven or eight speakers from industry and government sharing their experiences of analytics in practice. The event now attracts between 150 and 200 attendees, the majority being practitioners from within and without the OR community.
- The development of an Analytics Network that has regular meetings and an on-line presence.
- Regular training courses are offered with analytics as well as OR themes.

Our monthly newsletter (Inside OR) and website now display the tagline: 'OR at the Heart of Analytics.' Indeed, we see it as vital that the Society embraces analytics which presents both an opportunity for OR and a threat; what if someone else were to establish a UK analytics society?

Of course OR does not cover all of analytics. There is a strong technology (computing and data management) element in analytics, which is not a primary concern for many OR practitioners or academics. Where our concern lies is with the quantitative underpinnings of analytics and with the decision-making practices of those using analytics. Hence, we have adopted the term 'decision analytics' in preference to 'advanced analytics' to refer to the role of OR. This is based on the observation that OR does not necessarily have to be advanced, but it does have to be appropriate for the decision that is being taken.

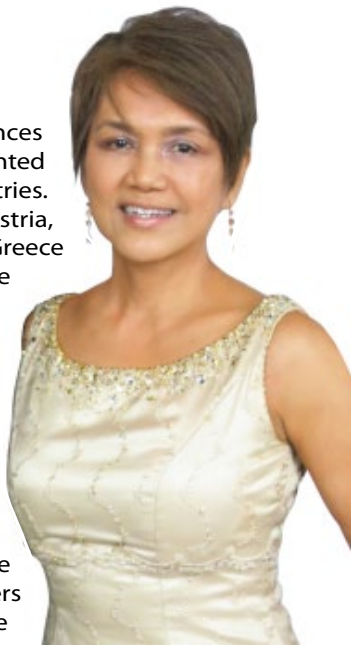
Over the last year the OR Society has been looking to further develop its connections with analytics. We are particularly keen to draw in interest from those researching and practising analytics who may not know about OR. The Society's Analytics Development Group, under the leadership of our Vice-President John Hopes, is looking to enhance our offering to the analytics community. One important route we see is providing some form of accreditation for analytics professionals. A second is to provide publications on analytics. In March we are launching a new magazine ('Impact'), aimed at practitioners and users of OR and analytics. This will be available in print and also free of charge on-line. IFORS members are welcome to access the magazine.

I conclude with some concerns over academic engagement with analytics. In a survey, based on the International Abstracts of OR, we were only able to find 23 publications up to the end of 2013 with analytics in the title or abstract. This suggests a dearth of interest among OR academics. Meanwhile, in the UK we are seeing the growth of academic posts with data science in the title, but with few based in OR groups. As with the industry-based groups, it is imperative that academic OR groups adapt to this new world. I am not suggesting that we abandon out disciplinary routes, but we must market ourselves more effectively or risk being sidelined.

## FROM THE EDITOR

# The Road Ahead

**Elise del Rosario** <elise.del.rosario@stepforward.ph>



Articles in this issue bring to mind the often-quoted phrase "the only thing certain about the future is uncertainty."

In this issue, we read with interest our guest editorial on how OR should position itself vis-à-vis the growing Analytics field. We also hear from our newly elected IFORS President for 2016-2018 on how exciting the times have become for IFORS. Indeed, the future is full of uncertainties! Would Alan Turing have thought that he would be a celebrated mathematician decades after he died? Our Book Review tells us more about it.

Here we also read about how OR people have addressed uncertainties with creative solutions. One just needs to go over our OR Impact feature on how in eight days, such benefits as decreases in number of lost calls and average time to answer were attained for a call center without increasing staff costs; or how, in our Tutorial section, decision makers in developing countries cannot just depend on standard solutions to address the unique issues they face.

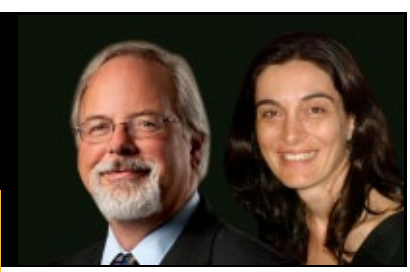
Other OR for development topics will be taken up in the ICORD conference coming up in Sri Lanka, as well as in the EWG ORD conference, which will happen before EURO2015.

Also, you will note in the Conferences news that the Nepal meeting highlighted applications of OR in developing countries. Meanwhile, other conferences in Austria, Uruguay, Turkey, Czechoslovakia and Greece addressed or will address issues that face us in the future, such as the connection of OR with other disciplines, and its role in tackling Big Data. The APORS and EURO regional conferences likewise invite participants to mull over these topics.

In the meantime, our youngest member, the Tunisian OR Society, is exerting all efforts to overcome geographical distance among members and potential members through the use of technology and social networking.

Thus, while the road ahead is littered with uncertainty, we find in this issue that the OR community has the right attitude and the right tools to make uncertainty more tractable!

On January 1, the following were elected for the term 2016-2018 to the post of IFORS President – Mike Trick
IFORS Vice President – Luciana Buriol



## FEATURE

# Looking Forward To Exciting Times Ahead

*At the beginning of 2015, the election of Mike Trick as IFORS President and of Luciana Buriol as IFORS Vice President for 2016-2018 was officially announced.(Please see their write-ups in the IFORS News September 2014 issue, pp.6-7.) Below are some excerpts of the* ***IFORS News (IN)*** *interview with* ***Trick (MT)****:*

**IN:** Some people say you were meant to be an IFORS President because of your historical IFORS "connection". Would you like to share this with our readers?

**MT:** Sir Charles Goodeve was the founding President of IFORS. He grew up in small towns in Manitoba, Canada, including a town named Stonewall. My parents both grew up in that town, and when I first started studying operational research, my Dad asked whether I knew of Sir Charles. I certainly do now!

**IN:** What in your view are the major issues and problems faced by IFORS today? What programs will you put in place to address these?

**MT:** These are great times for the field of operational research. The world, due partially to the popularity of "business analytics", is understanding that our approaches are needed to truly change data into better decisions. IFORS needs to find ways of spreading that excitement worldwide. It can do so by concentrating on its members, the national societies, and our regional groupings and ensuring that they have the material and resources necessary to spread the word in their areas.

**IN:** As former president of INFORMS, you faced several challenges. How different were those challenges to the challenges you see IFORS facing today?

**MT:** I was President of INFORMS in 2002. At the time, there was decreasing interest in our field, as represented by declining membership numbers. While INFORMS worked hard in that time to bring value to membership, it really took recent broad excitement in the field to truly bring growth. So, while my INFORMS time was about undoing declines, I hope that my IFORS time will be about growth and increasing interest.

**IN:** Have you given thought to the relationship between IFORS and its regional groups – APORS, ALIO, EURO and NORAM (basically INFORMS and CORS)?

**MT:** As our field grows, there are needs for activities at multiple levels: locally, nationally, regionally, and worldwide. The regional groupings are invaluable for providing services and support at the regional level. They are also critical in pointing out to IFORS the gaps between the regional offerings.

**IN:** You are not new to IFORS, having been VP for NORAM. What do you think you will do differently in the way you will manage IFORS vs how former IFORS presidents have done it? How would you describe your management style? Do you think this style will work in the context of the IFORS AC?

**MT:** I was VP for NORAM for six years, so I had the opportunity to work directly with three very talented Presidents: Paolo Toth (who was Past-President in my first NORMA term), Tom Magnanti, and Elise del Rosario. I know the succeeding President, Dominique de Werra, very well, sharing an interest in sports scheduling, and talked with him often on IFORS matters. Over the past few months, I have worked with the current President Nelson Maculan. Each brought tremendous skill and energy into the job. I hope I can bring the same level they brought.

Through them, and some of my other activities, I have gained an appreciation for the teamwork necessary for organizational success. When I was younger, I perhaps thought I had more answers than I really did (this is a pretty common failing of youth). I have learned how much better solutions are when there is a committed and engaged group working on problems. Because of this, I think I will be expecting a lot from the other members of the AC. With this commitment will come the rewards of truly having impact on the field of operational research.

**IN:** Do you have some early thoughts on how you might reorganise IFORS in order to address the priorities you have identified?

**MT:** One frustration for me in the structure of IFORS is the way almost all of the AC turns over every 3 years. With the exception of the Secretary, Treasurer, and President (who becomes Past President), there are all new people on the Committee. I do think we have to reorganize and strengthen our committee structure below the AC to provide continuity and cohesion in our plans. I also think we need to more seriously think about how we are supporting our membership (the national societies) and that may require additional infrastructure.

I am looking forward to my Presidential years. These are exciting times for our field, and exciting times for IFORS.

# CONFERENCES

## ALIO/EURO 2014: Applied Combinatorial Optimization Amid Candombe Rhythms

**Héctor Cancela** <cancela@fing.edu.uy>**, Antonio Mauttone** <mauttone@fing.edu.uy> **and María E. Urquhart** <urquhart@fing.edu.uy>

The VIII ALIO/EURO Workshop on Applied Combinatorial Optimization (ALIO/EURO 2014) was held in Montevideo, Uruguay, from December 8 to 10, 2014. The event was organized by the Operations Research Department of the Computer Science Institute, Faculty of Engineering of Universidad de la República. This was the eighth edition of the triennial international workshop jointly promoted by the Association of Latin-Iberoamerican Operational Research Societies (ALIO) and the Association of European Operational Research Societies (EURO).

Photo from the Opening session shows (l to r): María E. Urquhart, Program Committee Chair; Gerhard Wäscher, EURO President; Héctor Cancela, Dean of the Faculty of Engineering; José Luis González Velarde, ALIO President; and Antonio Mauttone.

The academic program included plenary talks from recognized academicians. Michel Gendreau spoke about *Stochastic Vehicle Routing*, Thomas Stützle gave a talk on *Automatic Algorithm Configuration*, while Andres Weintraub presented *Combinatorial Challenges in Forest Management Modelling*.

Of the103 extended abstracts received from Argentina, Belgium, Brazil, Chile, Colombia, Ecuador, France, Germany, Luxembourg, Mexico, Norway, Portugal, Qatar, Spain and Uruguay, 84 were accepted based on reviews of the international Program Committee. Two parallel tracks featured the final 77 papers covering such areas as: Metaheuristics, Polyhedral Combinatorics, Hybrid Heuristics, Branch and Cut and Price, Graphs and Theoretical Aspects, Transportation and Logistics, Vehicle Routing, Scheduling, Network Flows and Packing, Natural Resource Management, Energy Sector and Other Applications. A special issue of International Transactions in Operational Research (ITOR) on *Applied Combinatorial Optimization* will feature selected papers from the Workshop.

The event saw a good mix of 120 international participants, local academicians and students, who all benefited from the enriching academic activities and the personal interactions and friendships fostered by the welcome cocktail on the evening of the first day and the gala dinner on the following day. The dinner took place in a wonderful winery and featured Uruguayan meat and wine. Everyone enjoyed the lively *candombe*, one of the typical dances of Uruguay. The workshop venue also provided an opportunity to enjoy a walk and take in the the sunset in Rio de la Plata.

Antonio Mauttone, head of the Organizing Committee, expressed appreciation to the participants and fellow organizers as well as anticipation of the next Workshop edition.

# Complex Dynamical Systems At Center Stage in Ankara

**Hüseyin Merdan** <merdan@etu.edu.tr> **Songül Kaya Merdan** <smerdan@metu.edu.tr>
**Gerhard-Wilhelm Weber** <gweber@metu.edu.tr>

Participants take a break from complex dynamic systems.

The 3rd International Conference on Complex Dyanamical Systems: New Mathematical Concepts and Applications in Life Sciences (CDSC 2014, http://cdss2014.org/) was held at the TOBB University of Economics and Technology (http://etu.edu.tr/c/indexa2b0.html?q=en/node) in Ankara, Turkey from November 24-26, 2014.

The conference was also held on the occasion of Prof. Marat Akhmet's 60th birthday. Akhmet has for decades been one of the leading scholars in study areas of complex dynamical systems which permit the existence of impulses and delays, thus pioneering contributions in the fields of medicine, biology and biotechnology. He had also served the OR community as a stream co-organizer at EURO conferences and as author of excellent articles in *OR* journals such as EJOR.

Organized since 2012, the conference series focuses on the one of the most attractive subjects of modern science, the dynamics of complex systems. The aims of the conference are to promote, encourage and bring together researchers in the different research areas of Mathematics, Engineering, Medicine, Physics, Biology, and Economics. Among Operational Researchers, system dynamics is a well-known and widely used methodology, often with special attention to the human factor - the individual, the group and the society. Dynamics of complex systems are now considering extensions to system dynamics. In the last 50 years, scientific progress in the area has grown and CDSC has provided a platform for strengthening foundations, sharing recent findings and advances, discussing future perspectives and organizing collaborative efforts.

More than 100 researchers from 17 countries participated in the conference. The scientific program featured plenary speakers, invited speakers, contributed talks and poster sessions. Plenary sessions included: *Mathematical Neuroscience: From Neurons To Networks* by Stephen Coombes (University of Nottingham, UK); *Jupiters Belts, Our Ozone Holes, And Degenerate Tori* by Huseyin Kocak (University of Miami, USA); *On Flow Barriers And Switchability In Discontinuous Dynamical Systems* by Albert Luo (Southern Illinois University at Edwardsville, USA); and *DNA Elasticity And Its Biological Implications* by David Swigon (University of Pittsburgh, USA). The five Invited speakers were M.A. Aziz Alaoui (Universite du Havre, Normandie, France), Dumitru Baleanu (Çankaya University, Turkey), Nasser-Eddine Tatar (King Fahd University of Petroleum and Minerals, Saudi Arabia), Viktor Tkachenko (Institute of Mathematics, Ukraine), Cemil Tunç (Yüzüncü Yıl University, Turkey) and Radounae Yafia (Ibn Zohr University, Morocco). Among the 39 contibuted talks in the areas of continuous and discontinuous dynamics, chaos and complexity, biological models, mathematical neuroscience, control problems and mathematical modeling was the paper by Gerhard-Wilhelm Weber. In his paper, he combined both continuous and discrete sides of models, added the aspect of uncertainty to them and presented an optimal control of such a "stochastic hybrid systems" dynamics, with applications in finance, economics, natural sciences and engineering. Apart from the technical aspect, Weber also thanked the organizer, Hüseyin Merdan, for the devotion and vision, as well as attention to details that provided a good stage in which to exhibit the rich area of complex dynamical systems. The conference ended with another stage is being set, i.e., the announcement of the CDSC 2016 to be held in Morocco.

# Czech OR Society-Sponsored Conference on its 32nd Successful Year

**Jaroslav Ramík** <ramik@opf.slu.cz>

The Czech Society for Operations Research organized on September 10-12, 2014 the 32nd annual International Conference on Mathematical Methods in Economics - MME 2014 (http://mme2014.upol.cz/). This scientific event took place at the Faculty of Science, Palacký University, Olomouc, Czech Republic. A well-known event that attracts researchers working on the theory and applications of operations research and econometrics, MME was once again the meeting place of 250 experts from the Czech Republic, Slovakia, Poland, Austria, Italy, Finland and Canada. Students of applied mathematics and economics from the organising faculty of Science also participated in the event.

MME 2014 focused on the area of fuzzy methods for multiple criteria and group decision-making. The first keynote speaker, Ramík (Silesian University, Opava, Czech Republic) presented a lecture on *Pairwise Comparison Matrix With Fuzzy Elements* where he provided an overview of the theory of pairwise comparison matrices and introduced new results for the fuzzy case. The second keynote speaker, Michele Fedrizzi (University of Trento, Italy) talked on *Pareto Efficient Weights From Pairwise Comparison Matrices And Norm-Induced Distances* in which he presented findings which included a surprising result on the computation of weights for the AHP method. An AHP based software for MCDM based on pairwise comparisons of alternatives was also presented. Methods based on pairwise comparisons (AHP) were also covered in other lectures. The FuzzME software (Fuzzy Methods of Multiple-Criteria Evaluation) interestingly presented the computed fuzzy evaluations as representations of a given goal's level of fulfilment. For three days, the conference was held in seven parallel sessions devoted to various areas of operations research with a majority of topics in the financial applications area.

The PhD student paper competition was won by *Recursive Estimators Of GARCH Models: Selected Problems*, authored by Radek Hendrych from Charles University in Prague, Faculty of Mathematics and Physics. He received the 2014 Czech Society for Operations Research Award.

Conference participants had the opportunity of getting to know the beautiful historical city of Olomouc with its many baroque sights. The social programme offered the option to visit the romantic Bouzov castle or to become familiar with the beer brewing process at the Prerov brewery, which included beer tasting, of course.

The full text of all the papers published in the proceedings of the MME 2014 conference is available at http://mme2014.upol.cz/conference-proceedings. Since 2004. the proceedings of the Mathematical Methods in Economics conferences have been covered by the Conference Proceedings Citation Index by Thomson Reuters. The request for coverage of the 2014 proceedings has been submitted.

The next 33rd Annual International Conference on Mathematical Methods in Economics MME 2015 will take place at the Faculty of Economics, University of Western Bohemia, in the city of Cheb, Czech Republic, September 9-11, 2015, http://mme2015.fek.zcu.cz. Meanwhile, the International Conference on DEA in Economics and Finance 2015, ICDEAEF'15, co-organized by the Czech Society for Operations Research, will take place in Ostrava, in June, 4-6, 2015, see http://csov.vse.cz/files/ICDEAEF_15_CFP.pdf .

# HELORS Elects New Set of Officers; Announces 2015 Conference

**Evangelos Grigoroudis** <vangelis@ergasya.tuc.gr>

The Annual General Assembly of the Hellenic Operational Research Society (HELORS) held on February 16, 2015 at HELORS' office premises benefited from a large turnout of members and friends. The Annual General Assembly has traditionally been an important event where members take the opportunity to discuss and exchange views about current issues, renew and establish ties among members, and promote HELORS activities.

HELORS Board reports on the 2014 activites.

The Board of Directors reported on the activities, financials and sought approval for the budget and accompanying action plan for 2015 which involve the following:

- HELORS publications- the society's scientific journal "Operational Research: An International Journal" (www.springer.com/business&management/operations+research/journal/12351)
- New scientific conferences, - the 4th International Symposium and 26th National Conference on Operational Research, which will be held in Chania, Greece in June 4-6 (www.helors2015.tuc.gr)
- Promotion of HELORS activities to Greek University students and PhD candidates.

Finally, the bi-annual elections saw the following elected to the 2015 Board : John Psarras (National Technical University of Athens), Nikolaos Matsatsinis (Technical University of Crete), Vassilis Kostoglou (Alexander Technological Educational Institute of Thessaloniki), Haris Doukas (National Technical University of Athens),Nikos Tsotsolas (University of Piraeus), Evangelos Grigoroudis (Technical University of Crete), Dimitris Apostolou, (University of Piraeus), Yannis Politis (Region of Attica), Spiros Alexopoulos (Hellenic Gas Transmission System Operator), Eleftherios Siskos (National Technical University of Athens), and Panagiotis Mitropoulos (University of Patras).

It was also the opportunity to invite everyone to the 4th International Symposium and 26th National Conference on Operational Research, to be held in Chania-Crete, Greece (Creta Paradise Hotel), from 4-6 June, 2015. For this conference, invited speaker is Emmanuel Thanassoulis of the Operations & Information Management Group, Aston Business School, UK. Everyone was reminded of the extended abstract submission deadline of March 15.

# Sharing Science, Engineering and OR in Antalya

**Yavuz Can** <yavuz.can@fau.de> **Gerhard-Wilhelm Weber** <gweber@metu.edu.tr>

*The Conference on Computational and Experimental Science and Engineering* (ICCESEN 2014 - www.iccesen.org) took place from October 25 to 29 in one of the best known holiday centers in the world, Antalya, Turkey. The name of the venue within Antaly region is called *Kemer*. The conference covered the latest research results on the theory, methods and applications of the mathematical, energy, environmental, material, nuclear, biological, medical, physical, chemical and earth sciences.

HELORS Board reports on the 2014 activites.

Plenary talks included: *Accelerator Technology for Mankind* by Saleh Sultansoy (TOBB University, Ankara, Turkey); *Continuous-Discrete Optimal Control of Stochastic Hybrid Systems with Jumps Theory, Methods and Applications in Finance, Economics and Science* by Gerhard-Wilhelm Weber (METU, Ankara, Turkey); *Chalcopyrite Diluted Magnetic Semiconductors* by Witold Dobrowolski (Polish Academy of Sciences, Warsaw, Poland); *Exergetic Directions of Renewable Energy Systems* by Arif Hepbasli (Yasar University, Izmir, Turkey); *Development of Giant Magnetoresistance Material based on Cobalt Ferrite* by Mitra Djamal (Universitas Negeri Padang, Indonesia); *Perspectives of Physics in Materials Science Research* by R. S. Beniwal (CSIR-New Delhi, India); *Organic Photoelectronic Technologies* by. E. Sıddık Içli (Ege University, Izmir,Turkey); >>

>> *Photovoltaic organic Cells: Limitations and Perspectives* by Ali Cheknane (University of Amar Telidji-Laghouat, Algeria); *An Approach to Solving Decomposable Optimization Problems with Coupling Constraints and its Application in Experimental Psychology* by Oleg Burkadov (Linköping University, Sweden); and *Knowledge Management under Uncertainty in Neuro-Science Technology* by Madjid Fathi (University of Siegen, Germany).

Around 540 abstracts were distributed to seven streams and poster presentations. Selected papers will be submitted for publication in several SCI indexed journals e.g., Optimization Methods and Software (OMS), and the conference proceeding will be published in the conference series of a well-known publishing house.

The conference gave author Yavuz the opportunity to present his research on the emerging subject of *Electrical Engineering and Logic* to an international audience of scientists and in the process, get to know people working in related areas. In his search for German-speaking participants, Yavuz met co-author Weber from Middle East Technical University of Ankara (Turkey) with whom he had an intensive exchange of experiments, thoughts and, future academic steps.

Participants had the opportunity to participate in several interesting social activities such as rafting, a boat tour, a quad safari trip, an Anatolia Fire and Troia Show, Hamam and Spa, a "way and food" and a diving tour. The conference provided valuable opportunities to get to know the natural and historical wealth of Antalya.

All throughout the conference, Willi highlighted the role of modern *Operational Research* and its international community and the upcoming *Joint ORSC-EURO Conference 2015 on Continuous Optimization*, Shanghai, China, May 10-12, 2015 (http://orsc-euro2015.csp.escience.cn/dct/page/1) and EURO 2015 (http://www.euro2015.org/). Of course, everyone was reminded of the upcoming 2nd ICCESEN in October 2-7, 2015 to be held in Side, at the other side of Gulf of Antalya.

# Austrian, Swiss and German OR Gathering to Highlight Optimal Decisions and Big Data

**Gernot Tragler and Georg Pflug**

EGOR, the Austrian OR society, in cooperation with the the Swiss (SVOR/ASRO) and German (GOR) OR societies, is pleased to announce that the international OR2015 conference on Operations Research http://or2015.univie.ac.at/ will take place at the University of Vienna, Austria from September 1-4, 2015.

While the theme is "Optimal Decisions and Big Data", the conference covers all directions of Operation Research. The invited plenary speakers are Matteo Fischetti (Padova) and Steven Scott (Google). Identified 28 streams follow: Accounting and Revenue Management, Analytics, Bioinformatics, Computational and Experimental Economics, Continuous Optimization, Control Theory, Discrete Optimization, Graphs and Networks, Energy and Environment, Financial Modeling, Forecasting, Game Theory, Integer Programming, Logistics and Transportation, Metaheuristics, OR for Security, Multiple Criteria Decision Making, Networks and Regulation, Neural Nets and Fuzzy Systems, OR Software, Modeling Languages, Policy Modeling and Public Sector OR, Production and Operations Management, Scheduling and Project Management, Simulation and Decision Support, Stochastic Models, Stochastic Optimization, and Supply Chain Management.

There will be a business day, software and book exhibitions, an emerging scholar program and more. Practitioners and academics are invited to contribute their interdisciplinary perspectives in mathematics, computer science, economics and business. The social program promises to be a rich one, amid an environment full of history, art, music, science and Gemütlichkeit (warmth and friendliness)!

The last such conference was held in Zurich (see IFORS News December 2011, pp 6-7 http://ifors.org/web/newsletter/). This conference is held every four years, with the OR Societies in Austria (OEGOR), Germany (GOR) and Switzerland (SVOR/ASRO) taking turns in hosting it.

# Applications in Developing Countries Highlighted in ORSN Meet

**Sunity Shrestha Hada** <sunity.shresthahada7@gmail.com>


Guests and organizers shown during the opening ceremonies.

The Operations Research Society of Nepal (ORSN) celebrated its annual day on February 1 with a national conference held at The British College, Trade Tower Thapathali at Kathmandu. The theme of the conference was "Operations Research: Applications in Developing Countries". The conference was successful with 54 participants, four keynote papers and 12 technical papers that were a combination of hard and soft OR. The papers were presented by resource persons from Brazil, Japan and Nepal. The Chairman of University Grants Commission of Nepal, Parashar Prasad Koirala, inaugurated the conference. Each year, ORSN celebrates its annual day with national and international conference on alternate years. Thus, ORSN, is already at work on its international conference slated for February 1 next year.

# Preparations for ICORD 2015 Sri Lanka Prompts OR Society Formation

The International Conference on Operational Research for Development 2015 (ICORD 2015 http://ifors.org/icord2015/) details were finalized with the visit of Elise del Rosario to Sri Lanka, where she met with Prof. T S G Peiris of the University of Moratuwa. Peiris has accepted to Chair the Local Organizing Committee, with Arabinda Tripathy as Conference Chair.

Jointly sponsored by IFORS, the EWG-ORD and the University of Moratuwa Department of Mathematics, the Conference will be held from December 3 to 4 this year at the Palm Village Hotel, Uswetakeiyava (north of Colombo) Sri Lanka.

Started in 1992, ICORDs have been making impacts on IFORS in terms of its activities related to development and developing countries. Since 1992, it has been organised in Brazil, India, Italy, Philippines, South Africa, and Tunisia. ICORDs have been having participants from academic, research and practicing community with interest/ involvement/ experience in development related issues and/ or developing countries. As the workshop is rather intense in its deliberations, it usually has around 30 participants. Focused areas include broader context of education, health, community welfare, energy, environment, urban planning, agriculture, and the like.

In the course of the preparations, several Sri Lankan academics and practitioners warmed up to the idea of forming an OR Society of Sri Lanka. T S G Peiris, John NLC Fernando (former IBM country head), and Meth Weerakkody (Imperial Institute of Higher Education) with Chandana Perera (Sri Lankan Institute of Information Technology) and WB Daundasekara (University of Peradeniya) are forming a core group to evaluate the possibilities. With the objective of spreading the word about OR, IFORS was more than pleased to know of this development. Sue Merchant, VP at large and Head of the Developing Countries Committee in a communication with the proponents sends out an IFORS "benefits" brochure (see page 8) and states that the "main benefit is that of joining a big family which can support your society." In the meantime, Peiris is confident that ICORD will attract Sri Lankan practitioners and researchers in the area of OR and development.

University of Moratuwa Vice Chacellor AKW Jayawardane (left) and Math Department Head TSG Peiris pose with E. del Rosario.

IFORS
International Federation of Operational Research Societies

EURO WG-ORD
EURO Working Group on OR for Development

## The 2015 OR for Development Conference
## OR: Uplifting Living Conditions

**URL: http://ifors.org/ewg-ord**

**Graham Hills Building, University of Strathclyde**
**Glasgow, Scotland**
**July 9-10, 2015**
**(in conjunction with EURO 2015)**

## CALL FOR PARTICIPANTS

### The Conference

In both developed and developing countries, problems of poor planning, policy execution and institutional weaknesses have contributed greatly to the problems we face today such as hunger, poverty, pollution, massive wealth divide, poor education, inadequate health services, inadequate disaster response, access to government services.

Armed with the tools necessary to alleviate these conditions, many Operations Researchers have worked in these areas. A quick look at the papers in literature ( such as those found in (http://ifors.org/developing_countries/index.php?title=Main_Page) including entries and winners of the IFORS Prize for OR in Development (http://ifors.org/web/ifors-prize-for-or-in-development/) will show that a lot of work had been done in OR for Development.

This conference aims to bring together operations researchers who have used OR tools to address problems in education, health (e.g., spread of infectious diseases), basic public services, water, technology, resource use (physical or financial), infrastructure, agricultural, industrialization, environmental sustainability, energy, unabated population growth and climate change.

### Call for Participants

Participants must submit their work (either full paper or abstract of not less than 1,500 words) to to Honora Smith (honora.smith@soton.ac.uk) by 16 March 2015.

IFORS

International Federation of Operational Research Societies

# Bringing the World of Operational Research Together

## Purpose

The International Federation of Operational Research Societies (IFORS) is an umbrella organization set up in 1959, representing 50 national societies and several kindred societies. In all, it represents some 30,000 individual members. IFORS exists to:

- Promote the development of Operational Research (OR) worldwide, both in methodology and practice, and
- Link the member societies and regional groupings.

These objectives are achieved through:

- Publications
- Conferences
- Educational initiatives
- Newsletter and Web site
- Special programs for developing countries

## Structure

National Societies are organized into four regional groupings: EURO (Europe, including some from Africa), ALIO (Latin America), APORS (Asia Pacific region) and NORAM (North America). The Airline Group of IFORS (AGIFORS), composed of some 1,200 members, is a kindred society.

IFORS is run by a Board - consisting of the Representatives of all member countries - who decides on basic issues confronting IFORS. An Administrative Committee is responsible for the execution of activities and making proposals to the Board of Representatives.

The Administrative Committee is elected for periods of 3 years, and is composed of a President, a Vice President at large, four regional Vice Presidents, a Treasurer (whose term is renewable twice) responsible for handling all financial matters, and a Secretary responsible for all administrative and logistical matters and whose location corresponds to the headquarters of IFORS.

## Activities

To carry out its objectives, IFORS has developed a series of activities in different areas of interest to researchers, practitioners and teachers.

### Publications: Bringing New Ideas To You

The International Abstracts in Operations Research (IAOR) has a long tradition of collecting information on what is published worldwide in the area of Operations Research. The International Transactions in Operational Research (ITOR) contains methodological and applied articles with an important international outlook as articles come from different countries, reflecting the IFORS membership.


### Conferences: Coming Together To Share Ideas

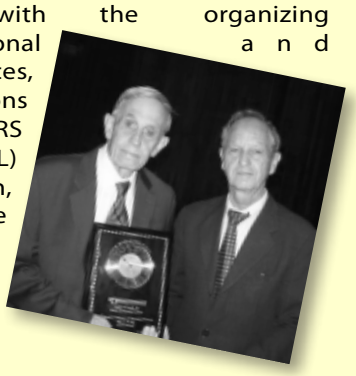
IFORS ensures that people involved in Operational Research around the world have opportunities to get to know one another and exchange ideas, knowledge and experience.

• The Triennial Conference, a tradition since 1957, brings OR academics and practitioners from around the world together. In addition to presenting a strong academic program, these conferences foster interaction among the members, developing bonds that may lead to future collaboration and idea sharing. Social activities are a big part, with a one-day excursion traditionally held on the middle day of the conference.

The last two Triennial Conferences were held in Melbourne, Australia in 2011 and in Barcelona, Spain in July, 2014. The 21st Triennial Conference will be held in Quebec City in 2017.


• IFORS also occasionally sponsors small "special conferences" on specific topics. These conferences generally attract about 150 attendees, and may be organized independently or with other professional organizations. IFORS provides sponsorship, publicity, organizational support and, through ITOR, a publishing outlet for refereed papers.

• IFORS also collaborates with the organizing committees of major national and regional conferences, helping to organize sessions and panels. The IFORS Distinguished Lecture (IDL), typically a plenary session, recognizes worldwide contributions to OR. The IFORS Tutorial Lecture (ITL) recognizes new research in emerging areas of OR.



## Educational Initiatives: Supporting Educators And Students

Believing that OR professionals in the early stage of their careers should be supported, IFORS sponsors students to attend the EURO and ALIO Summer Schools. The aim of the summer schools is to encourage good social and working relationships among promising early stage OR scientists. Call for candidates including specific criteria is posted every year on the IFORS website. IFORS provides travel and accommodation funds to selected scholars.

IFORS offers support for educators and students through their Education Resources website. (http://educationresources.ifors.org/) Routine contributions from various OR societies makes this site the best location to begin your search for tools to learn about OR. Search capabilities by type of media (lectures, books, videos, slideshows, etc.) as well as technical interest areas (game theory, decision analysis, simulation, etc.) make it easy to find techniques to improve the OR student experience.

## News And Website: Information That's A Click Away

The IFORS News is a non-scientific publication and carries information on IFORS and OR activities/initiatives worldwide. One of its key roles is to establish a link among the various member societies. The IFORS News features member society activities, relevant articles and conferences contributed by the society correspondents. It also includes regular sections on: Tutorial, Book Review, OR Society in Focus, Developing Countries Section, OR Impact (projects implemented in practice). The newsletter reaches all members of the national societies and a great number of lone OR workers spread all over the globe.

The IFORS website, a key tool in the promotion of OR internationally, is a valuable resource for any practitioner or academic. Bookmark http://www.ifors.org and visit it regularly.

The site includes:

- Notifications of conferences/ workshops and prize competitions
- Career Opportunities
- Activities of member societies
- Learning resources (videos, lectures, slides)
- Links to national societies and regional groupings
- Separate pages for Developing Countries, including one on Resources which has useful papers on a wide range of subjects and topics of interest to developing countries.
- Member-only section where members can cast votes on such issues as applications for membership; proposals for Triennial conferences; and Minutes of the Board of Representatives Meeting.

## Developing Countries: Fostering The Use Of OR for Development

IFORS plays an important role in ensuring that developing countries reap the benefits of Operational Research.

- The International Conference on OR in Development (ICORD) provides a forum for researchers to interact and discuss issues of OR for development, as well as to learn and share applications, tools and implementation experiences in developing countries. Conferences locations have included: India, Brazil, the Philippines and South Africa.
- Beginning in 2011, a portion of the IFORS News has been dedicated to Developing Countries.
- The IFORS Prize, awarded at the close of the triennial conference, recognizes exemplary work in the area of OR for development. It carries a grand prize of US $4,000.00 and a runner up prize of US $2000.00.
- The Developing Country On-Line Resources page offers the OR worker many publicly available materials on the topic of OR for Development.

### Benefits

Joining IFORS gives local OR societies the facility to:

- Influence IFORS activities by proposing new initiatives;
- Attend and organize joint activities with other societies;
- Increase networking with other countries and local members;
- Be an active part of the regional OR group;
- Obtain mutual support and advice from others and share ideas on structuring, running, and developing your OR society;
- Engage with colleagues on the Board of IFORS representatives;
- Increase your country's input to International Abstracts in OR; and
- Access the various programs that IFORS has put in place, e.g., international speakers, updates on scholarships that are available.

IFORS NEWS
International Federation of Operational Research Societies

## Country Correspondents

| | |
|---|---|
| Argentine Informatics and Operations Research Society (SADIO) | **Esteban Feuerstein** |
| Australian Society for Operations Research (ASOR) | **Erhan Kozan** |
| Austrian Society of Operations Research (OGOR) | **Dr. Raimund Kovacevic** |
| Byelorussian Operational Research Society (ByORS) | **Prof. Dr. Vladimir Golovko** |
| Brazilian Society of Operational Research (SOBRAPO) | **Sheila Zokner** |
| Canadian Operational Research Society (CORS/SCRO) | **Dionne Aleman** |
| Chilean Operational Research Society / Instituto Chileno de Investigacion de Operaciones (ICHIO) | **Victor Albornoz** |
| OR Society of China (ORSC) | **Degang Liu** |
| Croation Operational Research Society | **Snjezana Pivac** |
| Czech Operational Research Society (CSOR) | **Jaroslav Ramik** |
| Danish Operations Research Society (DORS) | **Sanne Wohlk** |
| Finnish Operations Research Society (FORS) | **Toumas Lahtinen** |
| The French Operations Research and Decision-Aid Society (ROADEF) | **Luce Brotocorne** |
| German Society of Operations Research (GOR) | **Corinna Hallman** |
| Hellenic Operational Research Society (HELORS) | **Evangelos Grigorousdis** |
| Hungarian Operational Research Society (HORS) | **Imreh Csanad** |
| Operational Research Society of India (ORSI) | **N.M. Ganguli** |
| The Iranian Operations Research Society (IORS) | **Nezam Mahdavi-Amiri** |
| Analytics Society of Ireland | **Cathal Brugha** |
| KORMS (Korean Operations Research and Management Science Society) | **Chang Won Lee** |
| Lithuanian Operational Research Society (LitORS) | **Leonidas Sakalauskas** |
| Management Science/ Operations Research of Malaysia (MSORSM) | **Ilias Mamat** |
| Operational Research Society of Nepal (ORSN) | **Sunity Shrestha Hada** |
| Dutch Society for Operations Research | **LCM Kallenberg** |
| Peruvian Society of Operations Research and Systems | **Orestes Cachay Bosa** |
| Operations Research Society of the Philippines (ORSP) | **Malu de Guzman U** |
| The Association of Polish Operational Research Societies (ASPORS) | **Jan W. Owsiński** |
| Portuguese OR Association | **Ana Luia Custodio** |
| Operational Research Society of Singapore (ORSS) | **Huang Boray** |
| Slovenian Society INFORMATIKA - Section for Operational Research (SDI-SOR) | **Niko Schlamberger** |
| Operations Research Society of South Africa (ORSSA) | **Martin Kidd** |
| Spanish Society of Statistics and Operations Research (SEIO) | **Juan-José Salazar-González** |
| The Swedish Operations Research Society (SOAF/SORA) | **Tomas Gustafsson** |
| INFORMS | **Grace Lin** |
| Asociación Uruguaya de Informática e Investigación Operativa (AUDIIO | **María E. Urquhart** |


The Management Science/Operations Research Society of Malaysia (MSORSM) is delighted to announce that the 10th Triennial Conference of the Association of Asia-Pacific Operational Research Societies (APORS 2015) will be held from **02 - 06 August 2015** in **Kuching, Sarawak, Malaysia**. An attractive scientific programme with diverse topics is being prepared, with particular emphasis on the theme - OR and the Environment.

Kuching is the perfect setting to highlight the chosen theme of the conference. Home to one of the oldest rainforests in the world, Sarawak is an epicentre of biodiversity. It sustains communities of indigenous people who live off the land without destroying the ecosystem that sustains it. Kuching's ways of balancing its promising economy and her environmental treasure trove is an inspiration for the potential positive impact OR has on issues that promote economic prosperity while preserving and protecting the Environment.

For latest information of the conference, please visit our official website at: http://msorsm.org/apors2015/.
We are also on Facebook (APORS 2015 Conference)!

If you have any queries, please do not hesitate to contact us at: apor2015@gmail.com.

**Important Dates**

**Abstract Submission Deadline:**
28 February 2015

**Notification of the Abstract Acceptance:**
15 March 2015

**Early Bird Registration and Payment Deadline:**
15 April 2015

**Regular Registration and Payment Deadline:**
15 June 2015

**Full Paper Submission Deadline:**
31 August 2015

**Conference:**
2-6 August 2015


The European Conference on Operational Research, EURO2015: Operational Research In Practice, (http://www.euro2015.org/) will take place at the University of Strathclyde's new Technology and Innovation Centre in Glasgow. It is **the** place to present your work and find out about other cutting edge ideas emerging from the Operational Research community. Glasgow is very lively city, and we have a great social programme to look forward to.

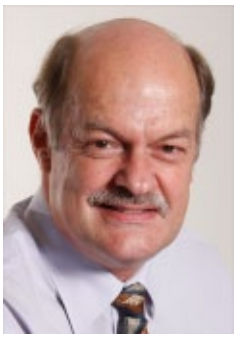
Researchers, academics, practitioners, and students interested in any branch of Operational Research, mathematical modelling or economic analysis are invited to submit abstracts or organise sessions.

The deadline for abstract submissions is March 16, 2015, but if you are interested in organising a session then you should contact the Programme Committee. More information is on the website, including details of the main topical areas, the Programme and Organising Committee members, and details of how to submit your abstract.

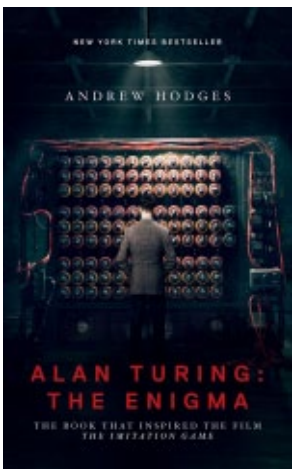
## Key Dates

- Registration: **NOW OPEN!**
- Abstract Submission: **NOW OPEN!**
- Early Bird Registration Deadline: **Monday 20th April 2015**
- Abstract Submission Deadline: **Monday 16th March 2015**
- Conference Start Date: **Sunday 12th July 2015**
- Welcome Reception @ the TIC Building: **Sunday 12th July 2015**
- Informal Social Evening @ Merchant Square: **Monday 13th July 2015**
- Conference Dinner @ The Arches: **Tuesday 14th July 2015**
- Farwell Gathering @ The Barony: **Wednesday 15th July 2015**
- Conference End Date: **Wednesday 15th July 2015**

# Deciphering an Enigma



**Hans Ittmann** < hittmann01@gmail.com>**, University of Johannesburg**




**Alan Turing: The Enigma by Andrew Hodges, November 2014. Princeton University Press; Updated edition, USA. pp. 768, ISBN-10: 069116472X, ISBN-13: 978-0691164724, USA Dollars 11.01 (Paper bag).**

It is not often that a mathematician gets featured in the editorial (Gibbs, December 2014) of a magazine such as *Time*. Referring to *The Imitation Game,* the film based on this book, Gibbs calls Turing "the brilliant, tortured father of modern computing." These days, people, most especially the young, cannot imagine a life without computers- they are simply everywhere and indispensable!

For the not-so-young, computer programs were written on sheets of paper, handed over to staff whose job it was to carefully "type" them onto punch cards. After instruction cards were added to the stack, a card reader enabled submission and program execution by the mainframe. Hard as it may be to comprehend for those who never experienced the era, imagine going back to the time when computing started. It is where this comprehensive biography by Hodges contributes to the understanding of the role that Turing played in what is now considered the Digital Revolution. Those of us in the field of OR will be delighted at the insights into the early developments and origins of the devices we use in our profession.

**An in depth understanding of Turing's work made it possible for Hodges to explain complex ideas, particularly the functioning of the Enigma machines and the work that went into the Turing machine. This greatly helps in making the reader understand how Turing thought, his originality, passion for truth (even to his own detriment), and relentless pursuit of that bridge that connects the worlds of the theoretical and the practical.**

The first part of the book is devoted to the origins of the Turing family and Turing's childhood. A year after his birth on 23 June 1912, Turing was left with a retired couple when his parents went back to India where his dad worked. His mother returned a couple of years later. An eccentric child, Turing was described by his mother as "being abstracted and dreamy, sometimes lost in his own thoughts." He wasn't the neatest child and when asked by his father if he would be good, he answered, ''Yes, but sometimes I shall forget!". At the age of 13, he went to Sherborne boarding school, where he realized he was homosexual. Turing became friends with a schoolmate, Christopher Morcom, who sadly died of tuberculosis. Throughout the rest of his life, he felt this loss and kept in regular contact with Morcom's mother.

Turing won a scholarship to read mathematics at King's College, Cambridge and using his prize money bought the book *Mathematical Foundations of Quantum Physics* by John von Neumann (see Gass and Assad, 2011). This stimulated his interest in the mathematics of what happens at the subatomic level. One of the pioneers of computer design, Von Neumann had a lasting effect on Turing.

At King's College, Turing was recognized for his abilities with his election as a Fellow at the age of 22. It was here that he was introduced to the three, now famous, questions the renowned mathematician Hilbert raised about any formal system of mathematics. Hilbert's third question, the *Entscheidungsproblem* or decision problem, was expressed as follows to Turing: "Is there a "mechanical process" that can be used to determine whether a particular logical statement is provable?" Turing loved solving "unsolvable" puzzles and this specific question led him, by refining the concept of "computable numbers", to the "Logical Computing Machine". This was an imaginary machine that could handle any mathematical computation. In 1936, he completed the paper "On Computable Numbers, with an Application to the *Entscheidungsproblem*" in which he conceived as a mathematical abstraction this "computing machine". The "Logical Computing Machine" later became known as the "Turing Machine" which "offered a bridge, a connection between abstract symbols, and the physical world". The book covers a lot of materials on this topic.

During the mid-thirties when the expectation of a World War was imminent, Turing refused an invitation to work in the USA in favor of joining the British government's cryptanalysis group as their first mathematician. From 1939, he was stationed at Bletchley Park where he played a major role in building machines to break the codes of the German encryption machine used for all German communication, the Enigma,. At some point, Turing was heading the Naval Enigma group. His work at Bletchley had a direct impact on the success of the Allied forces in combatting the onslaught of the U-boats. Turing and his colleagues achieved this by building a machine, called the "bombes," that was able to exploit weaknesses in the German encrypted code. With an enhancement suggested by mathematician Gordon Welchman, the bombe became one of the primary tools, and the major automated one, used to attack Enigma-enciphered messages. It was also during this period that Turing got engaged to a fellow cryptanalyst, which was called off as Turing confessed to being a homosexual.

Turing moved onto other interesting topics. He spent a year at Cambridge, then returned to Bletchy and initiated work on the Automatic Computing Engine (ACE). He was not happy with how this whole project was managed and did not get the recognition he deserved. From around 1945 to 1950, he was mostly involved in work related to a theory of structural evolution, or morphogenesis. He was elected a Fellow of the Royal Society in 1951, before reaching his 40th birthday.

Investigations of a reported robbery at his home led to his arrest, trial and conviction in February 1952 for ''Gross Indecency contrary to Section 11 of the Criminal Law Amendment Act 1885" or the practice of male homosexuality. It is interesting that he had always been frank about his sexual orientation at a time when homosexual relations were still a felony in Britain.

He was spared a prison sentence but subjected to hormonal injections. On June 7, 1954, he was found dead in his home near Manchester with a half-bitten, presumably cyanide-laced apple in his hand.

The last part of the book is devoted to (i) an in depth description of debates about artificial intelligence and (ii) the whole issue of gay rights and how wrong things were during those days. What OR people would appreciate about the book though is how the author, Hodges, himself a mathematician at Oxford University, gives an in depth and clear exposition, in mathematical "speak" and terms, throughout the book. This was made possible by his access to many different books, papers, documents, letters, as well as to Turing's family and friends. An in depth understanding of Turing's work made it possible for Hodges to explain complex ideas, particularly the functioning of the Enigma machines and the work that went into the Turing machine. This greatly helps in making the reader understand how Turing thought, his originality, passion for truth (even to his own detriment), and relentless pursuit of that bridge that connects the worlds of the theoretical and the practical.

Turing received many awards and recognitions. In the editorial to the Centenary Edition of this book, President Obama is mentioned to have singled out Newton, Darwin and Alan Turing as British contributors to science. In addition, British Prime Minister Gordon Brown in 2009 apologised officially in public for Turing's trial and punishment while Queen Elizabeth II granted him posthumous pardon in 2013. Finally, Isaacson (2014) who poses the question, "who invented the computer?" points out that it had been a collaborative effort of many individuals but adds, "a lot of the credit, too, should go to Turing for developing the concept of a universal computer."

As the book title suggests, Turing was the enigma - that perhaps no Turing machine nor for that matter, even Watson, can fathom.


• Gass, Saul I and Assad, Arjang A (editors), 2011. *Profiles in Operations Research*, Springer.
• Gibbs, Nancy, 2014. A *Brilliant Mind*, Time, December 1-8, Number 48, 2014.
• Isaacson, Walter, 2014. *The Innovators*, Simon & Schuster.


# OR IMPACT

**Articles demonstrating direct benefits from implementing OR studies**


**Section Editors: Sue Merchant** <suemerchant@hotmail.com>, **John Ranyard** <jranyard@cix.co.uk>

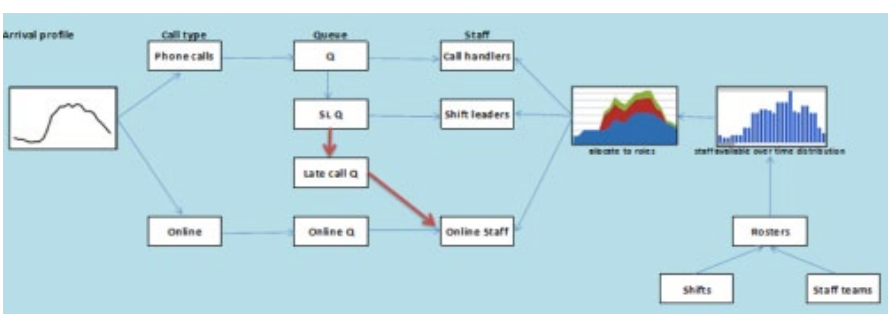

# Pro bono OR Delivers Quick Response to Call Center Problem

*The December's IFORS News on the UK 'pro bono' scheme included an example of a recent study carried out free by UK OR analysts. Here is a second example of this type of work for charities in the UK, this time by us :* ***Jane Parkin*** *of Carr House Consulting and* ***Sue Merchant*** *of Blue Link Consulting.*

**The problem:** We were asked to help with planning staff rosters for a charity's call centre. The call centre is open 24/7 and handles phone calls and emails from the public who provide information (anonymously) which may be useful in solving crimes. The call centre was about to take on additional areas of work and anticipated a 60% increase in business which they needed to handle without increasing staffing costs while continuing to meet their customer service target (90% of calls to be answered within 20 seconds).

**How we tackled the problem:** We collected data on customer contacts (both phone calls and online forms) , mainly from the charity's call handling system where special runs were carried out to obtain the information needed for analysis, though there was also available much paper based information about current and potential rosters. We then analysed the information, summarising arrival patterns by time of day, day of week, and time of year.

There were gaps in the data: for example, whereas the duration of phone calls was known, there was no information on the time spent by staff on follow up work after a call was ended. As both the arrival of calls and the time spent answering calls was random, an off the shelf simulation package which was easy to learn and had appropriate facilities, including the ability to run quick 'what-if' scenarios, was chosen for the analysis. The model was able to handle current and forecast business volumes, two different process models, and different staff rosters. An example of model structure can be seen below:




This model has 2 types of customer contact (phone calls and online forms) and 3 types of staff (call handlers, online staff and shift leaders). At busy periods, calls can be rerouted to shift leaders and when they are also busy, rerouted again to online staff.

Before using the model to test different staff rosters, it needed to be validated against actual data. We did this by comparing the actual number of 'lost' calls (those calls that were unanswered as all staff were busy) with the number produced by the model for a full week. See diagram 1.

Once we were confident that the model was a sufficiently close representation of reality, we worked with the Staff Manager and the Performance Manager to try out different staff rosters. This was carried out as an iterative process (see below which shows the customer service KPI for the staff rosters actually in place and the 5 alternatives that were considered). >>

>> It was wonderful to see the faces of the managers as they realised the power of the simulation to compare options quickly.

The final agreed shift patterns indicated a 7% improvement in percentage of calls answered in target time, nearly 50% decrease in the number of lost calls, and a 40% decrease in the average time to answer a call without any increase in staffing costs. A month after the new shift patterns were introduced we received the following email from the Performance Manager:

*"This afternoon I received the management report figures for the Bureau, and I wanted to share the highlights with you as they reflect the first month on the new shift pattern.*

**The final agreed shift patterns indicated a 7% improvement in percentage of calls answered in target time, nearly 50% decrease in the number of lost calls, and a 40% decrease in the average time to answer a call without any increase in staffing costs.**

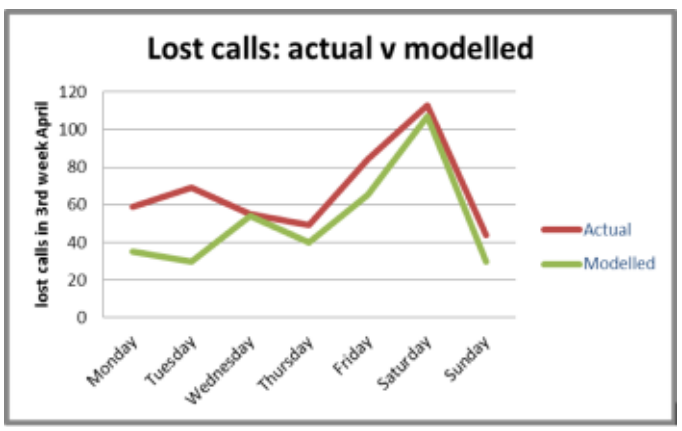



Diagram 1

*Service levels have increased from an average of 90% so far this year to 94.3% in January.*

*The percentage of lost calls has fallen from a peak of 12% to 5.7%.*

*I know this is just one month's data but it indicates that the expectations we had of the new patterns are being realised, combined with the efforts of all our staff at the Bureau.*

*We are grinning like Cheshire cats…….. Thank you for all your efforts – it really was worth it."*

In total the study took over 6 months elapsed time during which we put in about 8 days effort between us. Apart from meetings with the client (one in the client's call centre, one in the British Library and one in a wine bar in central London!) we worked remotely 200 miles apart and communicated electronically: we found it really useful to use two volunteers on the project as one could audit the work of the other, which was very important in a complex area like rostering.

We look forward to the next 'pro bono' challenge!

Details of how to set up a pro bono scheme are available at: http://ifors.org/web/or-studies-for-charities-by-volunteer-or-analysts/


Diagram 2

# TUTORIAL

## Facilitated Decision Aiding for Supporting Policy Making in Developing Countries

**Gilberto Montibeller** <g.montibeller@lse.ac.uk>, **Department of Management, London School of Economics**

**Introduction**

Facilitated decision aiding, whereby models are created on-the-spot with policy makers, enabling effective participation, continuous learning, and the appraisal of policy alternatives, has been extensively employed to support policy making in developed countries.

However, there are some characteristics of policy decisions in developing countries that make them typically more challenging than in developed ones. In this article, based on the workshop I ran during the International Conference on Operations Research for Development (ICORD 2014), I discuss briefly such challenges and how they can be overcome.

**Modes of Intervention in Operations Research**

Operations Research (OR) has been extensively employed in developing countries (see White et al. (2011) for a comprehensive review). Despite several different approaches being employed, such as optimization, simulation, problem structuring methods, among others, at their core is the aim of improving decision making. But the focus of improvement has been on one of two distinctive components of decision-making, namely, *content* and *process*.

Those interventions focused on improving the **content** of the decision being made attempt to enforce, or improve, substantive rationality (Simon 1986). This is done via extensive decision modeling, aiming at an efficient use of scarce resources and evidence-based policy making. The OR analyst in such intervention typically adopts what we have described as the 'expert mode' of intervention (Franco & Montibeller 2010).

In the expert mode, the problem situation faced by the client is given to the OR analyst, who then builds a model of the situation, solves the model to arrive at an optimal (or quasi-optimal) solution, and then provides a recommendation to the client, based on the obtained solution.

On the other hand, interventions focused on improving the decision-making **process** have typically group-process aims, such as promoting procedural justice, supporting effective participation and engagement, as well as achieving transparency and legitimacy in policy making (Tsoukias et al. 2013). The OR analyst in this type of intervention usually employs the 'facilitative mode' of intervention (Franco & Montibeller 2010).

In the facilitative mode, a group of representatives is placed as responsible for scoping, analyzing and solving the problem situation of interest. The group is supported by the OR analyst, who acts as a facilitator. Almost every step taken in the intervention – from defining the problem, to creating and analyzing models, to providing recommendations – is conducted interactively with the team. Figure 1 illustrates this modeling process.

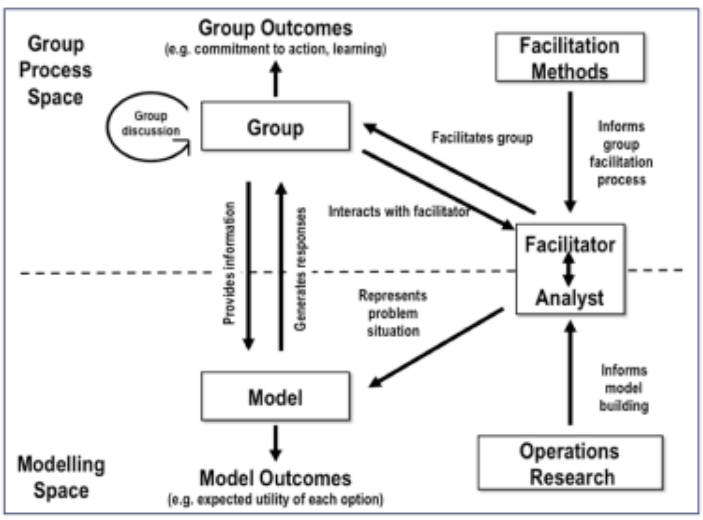



Figure 1. Facilitated Decision Aiding (adapted from Franco & Montibeller (2010)

There are many benefits of this type of engagement, such as enabling effective participation, promoting continuous learning, allowing the interactive appraisal of policy alternatives, and increasing the commitment of the decision making group on the way forward (Phillips 2007; Mingers & Rosenhead 2001).

However there are specific challenges that confront policy makers in less developed countries that can be particularly challenging for OR analysts, which are discussed next.

**Challenges of Policy Making in Developing Countries**

Key challenges for policy making in developing countries, when contrasted with those in developed countries (see also Bornstein & Rosenhead (1990) for an excellent discussion about OR in developing countries), include: (a) the multitude of conflicting objectives to be achieved, in combination with severely scarce resources; (b) the levels of uncertainty are much higher than the ones experienced in developed countries; (c) the non-consequentialist culture in many of these countries, where economic efficiency is not a main goal; (d) the lack of hard data necessary to assess different policies, which imposes serious limits on the data requirements of analytic tools; and (e) the historical lack of participation in societal decision making processes in most of these countries, where democracy is recent or incipient.

While the first four challenges are about problem content, the last one is concerned with decision-making processes. Solutions and adaptations of OR methods and OR interventions then have to consider both model-content issues and process-related aspects.

**Some Ways of Overcoming such Challenges**

My experience in the Americas over the last twenty years of extending support to decision-making and policy makers have pointed to the usefulness of some approaches in implementing facilitated decision aiding in developing countries.

Firstly, taking multiple stakeholders and their objectives into account can be supported with the use of causal maps and multi-criteria decision analysis (Belton et al. 1997; Bana e Costa et al. 1999; Montibeller & Belton 2006). Secondly, evaluating decision options under high levels of uncertainty can use robustness analysis (Rosenhead et al. 1972; Roy 2010) instead of optimality or expected value, even when multiple criteria are being considered (Montibeller et al. 2006; Montibeller & Franco 2011). Thirdly, other concerns beyond economic efficiency can be modeled with multi-attribute value analysis (Keeney & Raiffa 1993; von Winterfeldt & Edwards 1986). Fourthly, the lack of hard evidence can sometimes be alleviated by the appropriate use of expert judgments (Morgan 2014). And finally, the need for participation and legitimacy can make use of policy analytics (Tsoukias et al. 2013) and careful design of consultation and public decision workshops, which deal adequately with issues of power and involvement, minimizing dysfunctional group behaviors (Kerr & Tindale 2004) with model-based facilitation (Phillips 2007; Franco & Montibeller 2010).

Four projects illustrating the use of these concepts and tools in developing countries follow. We have supported town planning in the South of Brazil for the Brazilian Center for Small and Medium Enterprises (SEBRAE) with a combination of causal maps for problem structuring and multi-criteria value analysis for the assessment of strategies for town development. We involved a large group of stakeholders, who were interviewed individually and their maps then aggregated, which became the basis for a multi-criteria model. In a town hall meeting, we elicited the preferences of the community and ranked the development options in terms of value added. This promoted a rich discussion among the key stakeholders paving the way forward for the community and city (Ensslin et al. 1997).

In another project (unpublished due to a confidentiality agreement), we supported the maintenance team of Itaipu Binational (one of the largest hydroelectric power plants in the world, owned by Brazil and Paraguay) in developing a multi-criteria evaluation of maintenance performance. 'Regular' technical challenges were compounded by the tense relationships among the teams in the company - 50% Brazilians and 50% Paraguayans – with a very hierarchical structure. Cultural issues had to be properly addressed when developing the multi-criteria model, and it was crucial that one of the facilitators was bi-lingual, speaking both Portuguese and Spanish, to gain the trust of the Paraguayan members of the group.

We have also explored the use of robustness analysis with multi-criteria evaluations (Montibeller et al. 2006; Montibeller & Franco 2011) in a series of case studies in Trinidad and Tobago linked with development issues. These included evaluating the robustness of strategies for the island's long term food supply, defining priorities for infrastructure development for the Penal/Debe Corporation, selecting agricultural commodities for national development, and supporting the decision on the divestment of the government-owned industrial port (Ram et al. 2010; Ram & Montibeller 2013). In every case, we identified robust strategies against deep uncertainties and considered multiple conflicting objectives.

Another line of recent applications has been on health care prioritization, a crucial aspect for promoting development in the region. In particular, we have been working with the Pan-American Health Organization (PAHO) in the prioritization of programs against dog-transmitted rabies, using portfolio decision analysis to assess the added value of different initiatives against their costs.

The models allow an assessment of the health system of each country in terms of their capabilities, as well as a gap analysis against target levels (Del Rio Vilas et al. 2013).

**The Workshop – Challenges in Facilitated Decision Aiding**

Following the lecture on facilitated decision aiding for developing countries, described above, I conducted the ICORD workshop among participants who possessed vast experiences in conducting OR in developing countries.

Participants were encouraged to exchange experiences and extend the tools of facilitated decision aiding to support policy making.

Figure 2. A facilitated group discussion.

The following prompt was presented initially to the whole group:

*What are the challenges that we encounter when:*

- *facilitating decision aiding in developing countries?*
- *facilitating policy design and policy choices in developing countries?*

The participants were divided into four smaller groups, each one with a specific concern:

- Challenges of applying facilitated decision aiding given countries with different levels of economic development (less developed versus more developed).
- Challenges of applying facilitated decision aiding given countries with distinctive cultures (power distance, degree of individualism, level of uncertainty avoidance, etc.).
- Challenges of applying facilitated decision aiding given countries with different institutional arrangements (extractive versus inclusive).
- Challenges of applying facilitated decision aiding given countries with distinctive social norms (levels of trust, power relations, process of selection of leaders, decision making practices).

Groups were encouraged to write their ideas on large post-its and organize both challenges and solutions, as shown in photos displayed in Figures 2 and 3.

Some of the interesting results of the group discussions are shown in the photos below, which highlight several other challenges in deploying facilitated decision aiding and creative solutions on how to overcome some of them (Figures 4 and 5).

Figure 3. Organizing the group ideas in post-its.

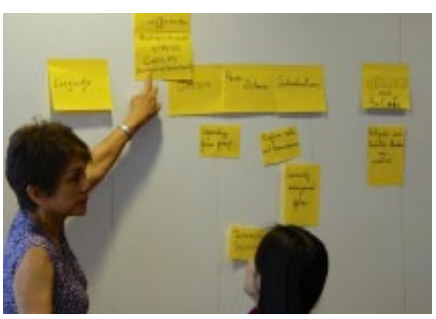


Figure 4. Results from the group in charge of discussing cultural challenges.

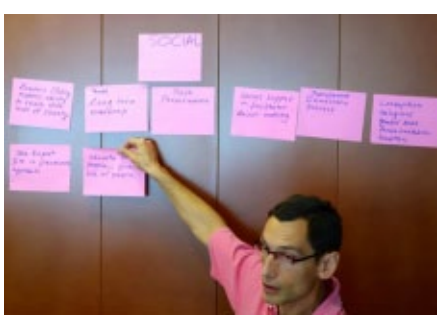


Figure 5. Results from the group in charge of discussing social challenges.

**Conclusions**

Facilitated decision aiding has been extensively employed in developed countries to support complex decisions and assessment of decision alternatives. There are huge potentials to employing them more extensively in developing countries, given their benefits, such as enabling effective participation, promoting continuous learning, allowing the interactive appraisal of policy alternatives, and increasing the commitment of the decision making group on the way forward.

In this article I discussed some of the challenges that OR analysts may confront when trying to apply the facilitative mode in these countries, based on my experience in several projects in the Americas and on the literature available. The group workshop also brought up other challenges and solutions, which highlight the importance of careful design of decision support processes and decision aiding methods in developing countries.

In the end, these challenges that OR analysts take up as they adapt their methods to intricate development problems and complex decision making environments are eventually rewarded with the outcome of bringing more fairness in the allocation of resources and more transparency in the public decisions.

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# Tunisian Operational Research Society: A Look Into Our Newest Member

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The Tunisian Operational Research Society - TORS - (www.tors-tn.org) was accepted into IFORS last November 2014. It was officially recognized in Tunisia in May 2013. The founder members belong to LOGIQ research unit at the university of Sfax, which is one of the top research groups in the area of OR in Tunisia.

**History**

The idea of forming a Tunisian OR society started during EURO 2009 in Bonn, Germany, where discussions were held between then IFORS President Elise Del Rosario and Youssef Masmoudi about the OR community in Tunisia. *(Editor's note: A previously accredited Tunisian national society was disqualified because of non-submission of IFORS requirements.)*

This led to continuous contact and collaboration, which culminated in the budding society's taking a major step in organizing the ICORD Workshop in Djerba from 12-13 October, 2012. The conference, led by Jonathan Rosenhead and Mike Cushman, introduced to 30 participants from around the world Problem Structuring Methods (PSM), and how they could be applied to problems within a development context. Heading the local organizing committee was Youssef Masmoudi, who led the subsequent work in getting the Society recognized by the government and who was subsequently elected President. All along the way, help was extended by IFORS in these formative years.

**Aims**

TORS aims to share, exchange knowledge and promote theoretical developments and applications in the operational research field in Tunisia. This is performed by:

- Supporting education, training, research and practices in this field;
- Organizing national and international conferences and workshops to enhance and promote the exchange of knowledge, the collaborations and the interactions between researchers and practitioners;
- Establishing and maintaining scientific cooperation with national and international institutions and other operational research societies; and
- Providing professional consultancy services to decision makers in industry and administrative fields.

**Activities**

A young organization needs to expand its membership base. OR promotion is actively done through visits by TORS founders to different universities. Here, they present the benefits and advantages of being a part of TORS. The first such visit was to the university of Gabes and Gafsa (South of Tunisia) where a meeting was organized with several OR faculty members. They, in turn, helped a lot in introducing TORS in the southern part of Tunisia. The founding members, belonging to the universities north of Tunisia, also use their networks to advertise TORS in the academic and industrial environments.

Promotion in local, national and international conferences is carried out by giving a 10-minute plenary presentation on the benefits of TORS membership, which include - Networking, Professional Mentoring, Career Development, Learning, Development and Professional Recognition. TORS uses social networking, with TORS Facebook group page (FB/groups/TORS.ASSOC) counting more than 50 members and around 200 supporters.

In addition to the team created to enhance the marketing and advertising of TORS within universities and industries, four other teams were created to lead the following TORS activities:

- TORS annual conference to be held in June 13-14, 2015. During this conference, the election of the executive members for 2015-2017 tenure will be held;
- Training and coaching- the main objective is to plan and ensure training and courses for TORS members in OR tools. A very successful training was the first winter school CLA in December 16-18, 2013 at the International Institute of Technology, Sfax. This winter school covered CPLEX, LATEX and Arena simulation tool;
- Dissemination of OR news through the newsletter; and
- Website and flyer preparation.

The Society is fortunate to have partners and links with several Labs and research units, scientific associations and university colleges in Tunisia and abroad e.g., LOGIQ, SOIE, MODEOR, MODILS, ATID, IIT, ISB, IHECS, ISIMA.

Since 2013, several brainstorming sessions have been held to increase membership and think through TORS activities. In 2015, three meetings have been organized, all on-line, to allow maximum attendance.

Many challenges face this new society. An active membership as well as support from IFORS and other OR societies is vital.

Founders prepare for a meeting.

Members craft the TORS flyer.