OR NEWSLETTER

October 2007

Operational Research Society of New Zealand, Inc.
PO Box 6544, Wellesley St. Auckland, New Zealand, www.orsnz.org.nz

Contents

The newsletter is published three to four times per year, regular dates are March, June, September, and December. Submissions deadline is the 15th of the month for the following month's issue. Send contributions by email to the Newsletter editor, Matthias Ehrgott, at newsletter@orsnz.org.nz.

Letter from the President

The end of another year rapidly approaches! The signals can be seen in more than just the combined effects of daylight saving and the natural lengthening of daylight hours but also in the warming temperatures and bursts of fresh green foliage and spring flowers – personally, I have never been able disassociate the smell of freshly mown spring grass from the memories of stress, pressures and anxieties of approaching examinations! But much more importantly, the past week has seen the completion of Part IV projects for 2007 and once again those of us, who have been around for more years than we care to count, can once again only admire the quality of project reports and posters and the confident presentations that have been delivered by another cohort of completing students. There is no doubt that the Project represents a highlight of the final year of the undergraduate degree for both students and their supervisors and we look forward to the future highlight of these students presenting their OR project research at our upcoming conference.

And of course another sign of the approaching end of year and festive season is the upcoming conference season which includes our ORSNZ conference (see http://conference.orsnz.org.nz) being organized by Golbon Zakeri and her band of helpers to be held at the University of Auckland from the evening of Wednesday 27th until Friday 29th of November. We hope you'll be able to make time to attend our conference and tell us about your recent OR activities and/or hear what others including our Young Practitioners have to tell us! Before our conference, the Annual Meeting of INFORMS is to be held in Seattle in early November and I expect a small group of our NZ OR community will make the journey to attend this "OR extravaganza"! And then in early January, Matthias Ehrgott is organizing the 19th International Multiple Criteria Decision Making Conference with the theme "MCDM for Sustainable Energy and Transportation Systems" at the University of Auckland from 7 - 12 January 2008. While this date has been chosen to suit international visitors, we do hope you'll take a look at the website (see mcdm2008.orsnz.org.nz) and organise your summer vacation with a dual objective of visiting Auckland and attending this international conference with others who share a love of and passion for multiple objectives! I understand that more than 150 Abstracts have already been submitted and with Matthias' thorough organisation, the conference should be a big success.

I have recently been asked to write a short article about our Society for a newly established IFORS newsletter. If any of you have information about the establishment and the early days of the Society – I do recall speakers talking about this at the 40th Birthday Conference in

Wellington in 2005 – I would be very pleased to receive any details.

As I complete this contribution for the Newsletter, we have just begun yet another four year period of national mourning – well at least for some of us who are unlucky enough to experience the grief! But I guess it's a good reason to get back to some serious OR to take the mind off the disappointment if only it would help. With that thought in mind we are aware that OR has played a role in another sporting event of significant national interest but unfortunately, the results have been similarly depressing. So perhaps it is too much to hope that OR can bring us some relief at a time of national disaster!!

The best I can do is wish you well for the coming festive season and I hope we'll see you here in Auckland in the next month or two!

David Ryan

The State of OR

For the last eight months, it has been my pleasure to visit the University of Auckland, thanks to a Hood Fellowship kindly given by the University of Auckland Foundation. We have been living on the beautiful island of Waiheke, which has discouraged too much travel. In terms of lifestyle, this certainly has been a successful year (though the raging hailstorm outside while I write this is a bit discouraging: it is time for summer)!

Over the last couple of months, I have torn myself away from the island to visit Wellington, Christchurch and Hamilton in my role as the ORSNZ's Visiting Lecturer. At each of these places, I gave a lecture based on my Hood Fellowship Public Lecture entitled "The Science of Better: Practical Operations Research", a talk I gave in Auckland in May. That talk had two main points. First, operations research is tremendously important for businesses, providing business insight and competitive advantage. Companies operate better, save billions of dollars, create new products and services and generally work much better due to operations research. Second, the future is bright for OR: the combination of better data, faster computing, and improved algorithms is making our field more relevant and more important.

The response to the talks was quite varied, but interesting in its own right. Of course, the primary audience for such a talk is really non-OR people. All of us in the field know how important and relevant we are (don't we?). I think many of those outside our field learned something about what we do.

For those within OR, I definitely felt a mixed reaction. For those with their Deans or other administrators at the talk, of course they were delighted that they heard all this good stuff about our field. But there was a little bit of "aren't you whistling in the graveyard?". Membership in ORSNZ has decreased from over 200 to perhaps 130 in just a few years. Some major universities have no OR presence while others are decreasing their OR activity. OR departments in companies are decreasing or being eliminated. Isn't OR dying?

At the meeting in November, I will address the issue of membership as a guide to the health of a field. In a short form, decreasing membership in any professional society may be more a matter of broad social trends, along with an organization's inability to counteract those trends, than a sign of the health of a field. With regards to the other issues, I believe that OR is incredibly successful as a field. If we were any more successful, we would disappear completely!

I think the most telling sign of the success of OR is the willingness of other fields to take our approach, results, and successes and relabel them as their own. A few months ago, I was talking to a "computer scientist" who worked on tabu search approaches for timetabling problems. I made a statement along the lines that "of course you are doing operations research". He was genuinely shocked by such a notion. "I'm in Computer Science, not Operations Research", he sputtered. After a discussion on the history of timetabling in OR and how tabu search was created by an OR researcher, he was unswayed. At the end, he felt that since he didn't solve linear programs, he couldn't be doing operations research.

We see this schizophrenia over and over again, sometimes in our very membership. People in business schools have found it politic to claim to be in "Operations Management" instead of OR, even though their research hasn't moved very much. New areas, such as data mining and computational marketing, pretend to have sprung fully formed from the ether rather than acknowledge their OR roots. When I say, as I did in my Hood Lecture, that Google and Amazon are OR based, I have no doubt that their

founders and most in the company will talk about their "computer science" base or their "analytics" base or some such "word that isn't OR" usage.

Businesses are the same. While there is a decrease in "OR departments", there is a rise in "Business Analytics" or "Business Intelligence" or other such terms. There is no question that the amount of OR modeling done in companies is increasing, not decreasing. The amount of data being generated alone requires such modeling. But such modeling is being done either by an OR-trained person not in an OR department or by departments with alternative names.

So in a broad sense, the amount of OR being done is increasing. But such an increase may be of little solace to a member of a shrinking OR group in a business or university. Unless the term OR is associated with the successes firms have (with a corresponding trickle-down effect on educational programs that train students hired by firms), those of us who embrace the term will either face a more dismal future or be forced to latch on to some other term for survival. And that can't be good for the field or for society.

The purpose of the "Science of Better" campaign in the US, and corresponding campaigns around the world, was to create good associations for the phrase OR. This campaign was controversial within INFORMS. We (the INFORMS Board and other interested people) began with a long discussion on what phrase to use. At the end, we agreed that while "operations research" is a terrible phrase, it is the one we had, and continued discussion on which phrase to use would simply waste time. We then moved on to developing (or having developed: it turns out that OR is not necessarily good training for creating felicitous phrases and campaigns) websites, magazine ads, and other items to get the broader world (primarily business leaders) to associate OR with business success. The campaign was innovative, exciting, provocative, expensive, and maybe even a little bit effective.

That campaign is only the start of what needs to be done. I hope that everyone left the talk a little more excited about our field. What we really need is for everyone to speak a bit more about our field and our successes. We do great things, and are important. But we, as a field, are also balanced, modest, and somewhat introverted. We need to lose, or at least soften, some of those characteristics if we are to survive as a field.

OR does an awful lot of things right in New Zealand. I am extremely impressed with the honors projects being done around the country, and with the emphasis on practical aspects of operations research. There is a lot of world-class research being done, and a large number of extremely promising young people coming into the field. We just need to get word out more. So the next time someone asks you, "What do you do?", tell them "I'm in this great field called operations research, and we make things work better, and let me tell you a few stories about OR …". Ideally, they won't immediately bolt out of range, and you can gain another convert to our field. Because otherwise we might not have a field worthy of converting people to.

See you all in Auckland in November!

Michael Trick

People

Informs Fellow

The news on the grapevine is that our president, Professor David Ryan, has been elected an INFORMS Fellow.

Professor David Ryan

The Fellow Award is "reserved for distinguished individuals who have demonstrated outstanding and exceptional accomplishments and experience in operations research and the management sciences." A quick perusal of the INFORMS web site suggests that David is the first New Zealander to receive this award. David joins well known fellows such as Michael Trick, Andrés Weintraub, Fred W. Glover, George Nemhauser, Robert Bixby, Richard Larson, Ellis Johnson, Saul Gass, and, of course, George Dantzig.

Andrew Mason

42ND ANNUAL CONFERENCE OF THE ORSNZ

29-30 November 2007 Auckland, New Zealand

Operational Research Society of New Zealand, Inc.
PO Box 6544, Wellesley St. Auckland, New Zealand, www.orsnz.org.nz

The Auckland Branch of the ORSNZ, the Operations Research group, and the University of Auckland are pleased to host the 42nd Annual Conference of the Operational Research Society of New Zealand, ORSNZ'07, on the 29 and 30 of November 2007.

Call for Papers

We welcome papers on all aspects of operations research, with particular emphasis on practical applications. Please email your abstract, in 200 words or less, in plain text, to the conference organisers at *conference@orsnz.org.nz*.

Submission deadline for abstracts:
12 October 2007.

Following acceptance of your abstract, we will invite you to submit a full-length paper for publication in the conference proceedings. A copy of the proceedings will be provided to every attendee at the conference. Full papers must be submitted by email in pdf format to the conference organisers.

Submission deadline for full papers:
5 November, 2007.

Registration forms, guidelines for the preparation of full papers, and further information about the conference, will be available on the conference website *conference.orsnz.org.nz*.

Student Grants-in-Aid for the ORSNZ Annual Conference

Full-time students, who are members of ORSNZ, and plan to present a paper at the ORSNZ conference, are eligible for travel assistance from ORSNZ to attend the conference. Applications should be made using the conference registration form (see *conference.orsnz.org.nz*), and should be signed by the student's supervisor or Head of Department to confirm that the applicant is enrolled in a full-time university course. The completed registration form, together with an abstract of the planned paper, should be sent to the conference address above by 5 October, 2007. Grants will be payable at the conference upon production of a GST receipt for the travel expenses.

Young Practitioners' Prize (YPP)

OR practitioners and students who will be under 30 years of age on 29 November 2007 are invited to compete for the ORSNZ Young Practitioners' Prize. Condition for entry is the presentation of a paper at the 42nd Annual Conference of the ORSNZ. When registering for the conference, competitors should request that their paper be scheduled in the YPP session and must provide proof of their eligibility. The total prize money awarded will be $1,000, split between the authors of the best papers at the judges' discretion.

Golbon Zakeri

Logistics of Elections

The triennial local government elections (LGE) are arguably the largest logistics exercise in the country. 73 Territorial Authorites (TA) run elections for their mayor, Councillors in 283 wards, members in 144 community boards and subdivisions, members for 18 Regional Councils in 63 constituencies, 21 District Health Boards and 20 Licensing Trusts (in 42 wards).

At present it is uneconomic to produce high-quality colour-printed individual ballot papers in large volumes. Base stock is created to represent the form for subsets of residential electors in a given Territorial Authority. These are defined by Statistics NZ meshblocks, on which the 5-yearly census is based. Electors may vote for the Mayor, Ward (Councillor), Community Board / Subdivision (where applicable), Regional Council (constituency), District Health Board, Licensing Trust (if any) and any Special Issues.

Ratepayers may also be entitled to a vote depending on where they record their residential vote in relation to the area in which they rates on other properties. The golden rule for voting is that an elector only gets a single vote for a given issue.

There are also some additional rules. E.g. Unitary councils (e.g. Chatham Islands, Gisborne, Tasman) do not have a separate Regional Council.

Only residents can vote for DHBs, Licensing Trusts and Maori Regional Council Constituencies. People living on some off-shore Islands such as Motiti or owning moorings in Marinas may get a Regional Council Constituency vote.

Not all Councils have community boards. Where a community board is divided into subdivisions, usually to ensure local representation for widespread communities such as in the Far North, an elector only gets a single vote for the Community Board, regardless if they live and own in different subdivisions.

So if you live and own a property in Auckland City, you will only get a Community Board vote for a property owned in a different ward in the city. If you live in Auckland City but own a property elsewhere in the Region, then you can vote for the Mayor, Ward and Community Board in that area. If you live in Auckland City but live in a region outside the ARC boundaries, then you can vote for the RCC in that territory. Some territorial authorities (e.g. Franklin, Waitaki) have split Regional Constituencies, so even within such territorial authorities you may vote for two (or three in the case of Taupo) Regional Council Constituencies.

Leaving aside Special Issues such as Trusts (e.g. Development West Coast, Hutt Mana Charitable Trust), and Polls (voting representation, Fluoride) how many unique combinations of entitlements for a given are needed to satisfy these requirements? Most councils will not require them all. Some additional combinations were created to avoid creating base stock for a small number of electors. i.e. their entitlements were satisfied from a subset of another form.

John Paynter

Chapter News

Auckland News

The Auckland Branch of ORSNZ continues to be active on many fronts. Gerard Cachon, who is Fred R. Sullivan Professor of Operations and Information Management at the Wharton School arrived in Auckland at the end of August. He is visiting the Department of Engineering Science until June 2008. Gerard's interests encompass most of Operations Management (he is joint author of the textbook "Matching Supply with Demand: An Introduction to Operations Management") and he has published widely in the field. His recent research focuses on understanding how supply chains work in practice, and how their observed operation can be explained using game-theoretical models. With Professor Mike Trick (who is in Auckland until December) Gerard will be a plenary speaker at the ORSNZ Conference in Auckland on November 29 and 30.

Many of the OR faculty in Engineering Science have been travelling this winter. Matthias Ehr-

gott is on sabbatical this semester in France, but has been sighted in Canada. (Perhaps we might sight him on TV3 at the Parc du Prince?) David Ryan has just returned from his annual invited lectureship in Copenhagen. Hamish Waterer and David attended the George Nemhauser 70th Birthday symposium in Atlanta in July, and Hamish then went on to MIP07 in Montreal (an invited symposium of top mixed-integer programmers). At the same time, Andy Philpott, Golbon Zakeri and Tony Downward went to Prague in July for EURO 2007. Andy was then off to ICCOPT in Toronto in mid August, and SPXI (the International Stochastic Programming Conference) in Vienna at the end of August.

The Electric Power Optimization Centre held their 6th annual workshop on September 7. This was well-attended by representatives from the electricity industry and academia, and continues to be a valuable interface between academic research and modelling groups in the electricity industry. Andy Philpott was successful in the 2007 Marsden Grant awards. His project entitled "Infinite-dimensional auctions" is to be carried out in collaboration with Professor Eddie Anderson from UNSW. The grant is for $400,000 over three years.

You will be aware that this year the Auckland Branch is hosting the 2007 ORSNZ Conference on November 29, and November 30 (see separate notice in this Newsletter). On November 28, the Auckland Branch of ORSNZ and the Department of Engineering Science are hosting a one-day invited workshop on Modelling Competition in Supply Chains. More information is available by emailing Andy Philpott (a.philpott@auckland.ac.nz).

The Department of Engineering Science held its Year 4 project presentations on September 27 and 28. The talks were all of a (typically) high standard and ranged from vehicle routing models for grocery delivery and Telecom fault repairmen to neural network models for earthquake prediction. A full list is described below in Appendix 1. We hope to see many of these talks repeated at this year's conference.

Finally, in news that is hot off the press, David Ryan has been elected a Fellow of INFORMS. He will go to Seattle in November to be formally inducted into the INFORMS Fellowship. A full account of this ceremony will be included in the December Newsletter. In the meantime, if you Google "INFORMS Fellows", you will discover what an august and selective body of OR heroes this is. It comprises all of the Society's Presidents, von Neumann and Kimball prize winners, along with some select individuals who have made major contributions to the subject and the profession. This is a great honour for David and for ORSNZ, and we extend him our warmest congratulations.

- Varun Prasad Simulating the Engineering Science LAN
- Xinsheng Qu Optimal Electricity Dispatch under Uncertainty
- Jason Kramer Using Neural Networks to Predict Earthquakes
- Martin Peat Loading Congestion at New Zealand Aluminium Smelters
- Hung-I Cheng Improved Yield Frontier and User Interface for Forestry
- Colm Hartigan Dispatching Repairmen
- Lei Zhang Optimization of Well Placement and Flow
- Nathan Moore Scheduling the Delivery of Internet Supermarket Shopping Orders

Andy Philpott

Canterbury News

No News was reported from Canterbury.

Waikato News

No News was reported from Waikato.

Wellington News

Vicky Mabin is delighted to have handed over the reins for the Wellington branch to Mark Johnston, knowing it's in very capable hands!

Mark Johnston, new Wellington Branch Chair

Vicky has also indicated she's stepping down from ORSNZ Council as soon as they find someone to take over her present International Liaison portfolio. She's enjoyed her time in these roles and thanks all those who she's worked with on branch committees and on Council over more years than she cares to count.

Vicky is on research and study leave for the rest of the year and is thoroughly enjoying having time to reflect on and write up some past projects, and develop new ones. She's off to the annual Theory of Constraints (TOC ICO) conference in November in Las Vegas where she will be presenting a review on TOC fundamentals for those sitting certification examinations, as well as working on some projects with overseas colleagues. A recently finished project was the compilation of a workbook for TOC, for the big second year class we teach on Systems Thinking and Decision Making. In this course we have around 270 second year students, and we cover a range of systems thinking frameworks and topics, including Senge's system archetypes, causal loop diagrams, stakeholder analysis, theory of constraints, and project management. Vicky is still editing ITOR and is keen to receive good manuscripts – please see the separate item for the scope of the journal. Good applied papers welcome, especially those with a local flavour that can be applied in other countries.

John Davies is away for a month's annual leave in the northern hemisphere — not quite France, but close enough to be able to enjoy the RWC at a decent hour. John will be attending the Decision Science Institute Annual Conference in November. That leaves just Bob Cavana, Lawrie Corbett, Arun Elias and Ofer Zwikael at Victoria Management School finishing off the Operations Management/Decision Science/Systems teaching this semester. Arun has taken over as MBA Programme Director.

Stefanka Chukova and Mark Johnston (School of Mathematics, Statistics and Computer Science) are busy covering for their jet-setting statistics colleagues, many of whom have taken sabbatical leave this year. We have benefited from the new Bachelor of Engineering degree launched this year, in that we have nearly 100 additional students taking our first-year STAT131 course which covers probability models, decision trees and queueing systems. We have also been working hard to organise sponsorship for summer student projects in operations research, particularly scheduling and stochastic modelling. Any offers very welcome!

Prof Michael Trick (Carnegie Mellon University), the 2007 ORSNZ Visiting Lecturer, visited Wellington (9–10 August) and was a fantastic advertisement for Operations Research. He gave two talks: "Integer and Constraint Programming Approaches to Sports Scheduling" and "The Science of Better: Practical Operations Research". The first talk was a fascinating insight into the computationally extremely-difficult problem of scheduling Major League Baseball in the USA, while the second talk outlined how Operations Research lies at the heart of businesses such as Google, FedEx and Amazon.

The Wellington branch are planning to resume after-work talks from local people on topics of interest. Since the Unsolicited Electronic Messages Act 2007 now makes it an offence to send spam, please subscribe to the email announcements list if you are interested, and stay tuned. If you would like to join the list, simply visit the following webpage and fill in your details (which will remain confidential):

http://lists.vuw.ac.nz/mailman/listinfo/orsnz-wgtn

Mark Johnston, Vicky Mabin

Puzzle Corner

PUZZLE 10

Four UW staff members (SM's) are incarcerated in two adjoining cells, three in one cell and one in the other, in the well-known but dreaded dungeon below B Block. Each is blindfolded, gagged, and tied (hands and all) to a separate chair that is bolted to the floor. (Good grief, hopefully this will be practiced only very selectively!) The three chairs in the first cell are placed one behind the other, facing forward. A hat is placed on the head of each SM. The blindfolds are then removed. There is no way that the SM's can see their own hats, move, or communicate with each other in any way. Not that they

know it, but SM 2 has a red hat and SM 3 has a blue hat. However, all SM's know that:

- There are two red hats and two blue hats,
- SM 1 can see the hats of SM 2 and SM 3,
- SM 2 can see the hat of SM 3, and
- SM 3 (and SM 4 alone in the other cell) can't see any hats.

All four SM's are highly motivated to leave the dungeon and, being UW SM's, are capable of flawless and rapid logical deduction. Anyone who can explain which coloured hat they are wearing is allowed to leave. Who will be able to leave, and why?

Les Foulds

An Alternative Path to Understand Bidding in Combinatorial Auctions

A well-known approach to understanding bidding in auctions is to model the auction as a non-cooperative game and then, after a lot of work, find an appealing solution known as Nash equilibrium. Alternatively, we can model the auction as a so-called Bayesian game and try to compute Bayesian-Nash equilibriums. Such approach is quite compelling when solutions can be computed or, at the very least, when some of their properties can be deducted from a bunch of (sometimes partially) solved equations. When real-life issues are introduced into the model, namely, a large number of players or some innovative auction rules, this approach falls short of providing any useful insight.

Recently some researchers have started to use agent-based technology to simulate the dynamics of such complex trading mechanisms. Agent-based computational simulators allow for the inclusion of a rather large number of players or bidders. In particular, in a combinatorial auction (CA), which is the focus of my research lately, an agent-based simulator provides the means to test equilibrium properties of different bidding strategies. In a CA several items are simultaneously offered for sale by an auctioneer. The distinctive characteristic of a CA is that bidders are allowed to express their bids for bundles or subsets of the set of items, bidding a single price for each bundle. This contrasts with other auctions of multiple items, such as the simultaneous ascending auction, whereby a price is bid for each item individually. A round consists of bidders submitting their bids to the auctioneer, who computes the winners by solving the Winner Determination problem, a nontrivial task due to the possible overlaps among bid bundles. After the problem is solved the auction results are publicly known by all bidders, who use them to prepare their submissions in the next round. The auction ends when a stopping criterion is satisfied, for instance at a given round no new bids are submitted. Bundle-bidding allows bidders to express their preference for items they would like to get while bidding a single price for the bundle.

Combinatorial auctions have attracted a lot of attention because of their advantages over other auction formats. In fact they have been and are being used in many contexts: many supply chains benefit from the more flexible format introduced by combinatorial auctions and decisions on who to buy from, quantity and price are the results of such auctions. In Chile suppliers of school meals to the public school system are bidders on combinatorial auctions. Mars Inc. runs frequent auctions among its suppliers; its need to purchase ingredients, packages, product containers and labels is satisfied through the administration of combinatorial auctions. Finally governments should more seriously consider using them to improve the efficiency and transparency of their procurement processes.

As attractive and convenient as they may seem, combinatorial auctions pose a lot of practical problems an auctioneer would have to solve before attempting to run any. One of the most recurrent questions a seller asks is whether a given selling procedure will improve the efficiency of the transaction, whether this is measured as its own benefit – for instance a private business procuring its supplies – or a government agency trying to minimize the transactions costs of the procurement process. The auctioneer also has to specify the exact format to be used by the bidders´ bids. The latter is known as a bidding language; it allows the auctioneer to accept only one or more bundles per bidder as well as awarding only one or more bundles to a bidder. On the other hand, bidders are concerned with how to bid in order to satisfy their purchase requirements at the minimum possible price. A bidder's bidding action plan for the whole duration of the auction is a bidding strategy.

We have developed an agent-based simulator to study the equilibrium properties of bidding strategies in combinatorial auctions. One of the

most exciting aspects of this work is the way in which three seemingly distant and unrelated fields come across, decisively contributing to advances in understanding combinatorial auctions as well as a whole range of other resource allocation mechanisms.

First, known resource allocation models are used in the context of decentralized decision-making which makes the problems more akin to market-based problems; thus, a model for resource allocation becomes a market mechanism. Auctions are a good example; since it is acknowledged that no central decision-maker has all the information necessary to solve the efficient allocation of items to bidders, a (centralised) optimisation algorithm does not suffice.

Second, because information is not publicly known (bidders do not know what other bidders want or how much they value the items they seek to win), bidders need to behave strategically. There is no *a-priori* reason why a bidder should reveal her information; otherwise her chances to win would decrease. Game Theory models and solution concepts, that is, the modelling of strategic interaction, are then very useful for the analysis of these problems.

Third, because usually the resulting game theoretic models are intractable, simulation provides a way to deal with such hurdle. Agent-based simulators in which each particular bidder is represented by a computational agent endowed with particular strategies are used to investigate which strategy profiles, that is, particular combinations of strategies across the set of bidders, turn out to be equilibriums of the situation at hand.

In summary, when studying combinatorial auctions, a mechanism for the efficient allocation of multiple items to multiple potential buyers each possessing private information on their preferences and tastes, the integration of optimization techniques, game theory models and agent-based simulation proves to be an excellent vehicle to understand what characterizes efficient allocations (or equilibriums); in a more general sense, such integration of methods and tools allows to better understand the potential of mechanisms designed to study efficiency properties of solutions to private and public resource allocation problems.

A couple of good sources on the methodological aspects used by our research:

Reeves, D.M., Wellman, M.P., Mackie-Mason, J.K.., Osepayshvili, A.: "*Exploring bidding strategies for market-based scheduling*". Decision Support Systems 39 2005, pp. 67-85.

Mackie-Mason, J. K., M. P. Wellman (2006) "*Automated markets and trading agents*". In Handbook of Computational Economics: Agent-Based Computational Economics, Volume 2. Tesfatsion, L. K.L. Judd (Eds.) Elsevier B.V.

Fernando Beltrán

International Transactions in Operational Research (ITOR)

aims to advance the understanding and practice of Operational Research and Management Science internationally. Its scope includes:

- international problems, such as those of fisheries management, environmental issues, and global competitiveness;
- international work done by major OR figures;
- studies of worldwide interest from nations with emerging OR communities;
- national or regional OR work which has the potential for application in other nations;
- technical developments of international interest;
- specific organizational examples that can be applied in other countries;
- national and international presentations of transnational interest;
- broadly relevant professional issues, such as those of ethics and practice; and
- applications relevant to global industries, such as operations management, manufacturing, and logistics.

Department of Engineering Science

http://www.esc.auckland.ac.nz

Operational Research Society of New Zealand

http://www.orsnz.org.nz

Modelling Competition in Supply Chains

Wednesday, November 28 , 2007

Room 439.201, 70 Symonds Street, Auckland

The Department of Engineering Science at the University of Auckland in collaboration with the Operational Research Society of New Zealand is holding a one-day invited seminar on modelling competition in supply chains. Members of ORSNZ who are interested in attending this seminar should contact Andy Philpott a.philpott@auckland.ac.nz for further information.

9:00:	Convene in common room, 70 Symonds Street
9:00 –10:00:	Professor Alan Stenger (University of Auckland)
	An Overview of Competition within and between Supply Chains
10:00 – 11:00:	Professor Gerard Cachon (Wharton School of Business, Philadelphia)
	The impact of competition on retail inventories
11:00 – 11:30:	Coffee
11:30 – 12:30:	Professor Eddie Anderson (Australian Graduate School of Business, Sydney)
	Competing investment strategies with fixed costs and uncertainty (joint work with Shu-Jung Sunny Yang)
12:30 – 1:30:	Lunch
1:30 – 2:30:	Professor Garrett van Ryzin (Columbia Business School, New York)
	Incentives for variety in supply chain management
2:30 – 3:30:	Professor Tava Olsen (Olin Business School, St Louis)
	Inventory competition with market share dynamics
3:30 – 4:00:	Coffee
4:00 – 5:00:	Discussion

19th International Conference on Multiple Criteria Decision Making

MCDM for Sustainable Energy and Transportation Systems

The University of Auckland, Auckland, New Zealand

7-12 January 2008

Website mcdm2008.orsnz.org.nz

Email mcdm2008@esc.auckland.ac.nz

The 21st century heralds an age of exponentially increasing demand for energy and transportation services in a globalised economy. Climate change and other environmental impacts of human economic activity necessitate the consideration of conflicting goals in decision making processes to develop sustainable systems. The science of multiple criteria decision making has a lot to offer in addressing this need. The International Society on Multiple Criteria Decision Making (MCDM) is organising its 19th International Conference under the theme MCDM for Sustainable Energy and Transportation Systems.

The conference covers all areas of MCDM, including

- Multiple Criteria Decision Aiding
- Multiple Criteria Classification, Ranking, and Sorting
- Multiple Objective Continuous and Combinatorial Optimisation
- Multiple Objective Metaheuristics
- Multiple Criteria Decision Making and Preference Modelling
- Fuzzy Multiple Criteria Decision Making
- Evolutionary Multiobjective Optimisation

Invited Speakers

Jim Petrie (University of Sydney)

Multi criteria decision making within energy networks for electricity production in emerging markets (joint work with R. Kempener and J. Beck)

The development of sustainable energy networks for electricity production poses many challenges. These include uncertainty in demand, diversity of primary feedstocks, the acute pressure of climate change impacts, and, in emerging economies, the vital role which such networks can play in stimulating social development. Any structured approach to decision making relating to such networks requires due consideration of multiple objectives, stakeholder diversity, system dynamics and key uncertainties. This talk will explore a synthesis of modeling tools, including the use of agent-based approaches and dynamic optimisation, for the design and evolution of electricity production networks in emerging markets. Attention is given here to the decision making practices of the individual agents which comprise the network, how these are informed by both quantitative and qualitative information, and how they give rise to emergent behaviour within the network. Case studies of bio-energy and coal-based networks are used to demonstrate the approach, and to draw out some general observations which relate to the challenges of modeling complex social systems.

Anna Nagurney (University of Massachusetts at Amherst)

Multicriteria Decision-Making for the Environment: Sustainability and Vulnerability Analysis of Critical Infrastructure Systems from Transportation Networks to Electric Power Supply Chains

In this talk, I will demonstrate how multicriteria decision-making can be utilized as a powerful framework for evaluating the sustainability of the critical infrastructure networks that underpin our societies and economies. These networks, which include transportation networks and electric power supply chains, in their present realizations, contribute in a major way to global pollution. I will show how environmentally conscious decision-makers can achieve the same environmental standards/results acting independently as would be achieved from certain governmentally imposed environmental standards. I will also describe recent results in network efficiency measurement and vulnerability analysis that allow one to determine, in the context of relevant criteria, which nodes and links (or combinations thereof) of network systems are most important in that their removal has the greatest impact on the network efficiency. This research has major impli-

cations for security, including environmental security, and infrastructure protection.

Proceedings Volume

Springer will publish a proceedings volume in the "Lecture Notes in Economics and Mathematical Systems". A call for full papers will be published on the conference website.

Registration

Registration is available on conference website. Full registration includes a 2 year electronic subscription to the Journal of Multi-Criteria Decision Analysis published by Wiley (see http://www.wiley.com/WileyCDA/WileyTitle/productCd-MCDA.html for more information on the journal) and free membership in the MCDM society.

Interview – Michael Trick

Professor Michael Trick is a visiting Professor of Operations Research from the Tepper School of Business at Carnegie Mellon University in Pittsburgh, Pennsylvania. He has been actively involved in the OR community, since receiving his doctorate from Georgia Tech in 1987. In 2002 he served as the president of *INFORMS*, and in 2004 he became Vice-President (North America) of *IFORS*, an umbrella organization of 46 national operations research societies. This year he has been in New Zealand under the Hood fellowship, and is the 2007 *ORSNZ* visiting Lecturer.

How did you become interested in Operations Research?

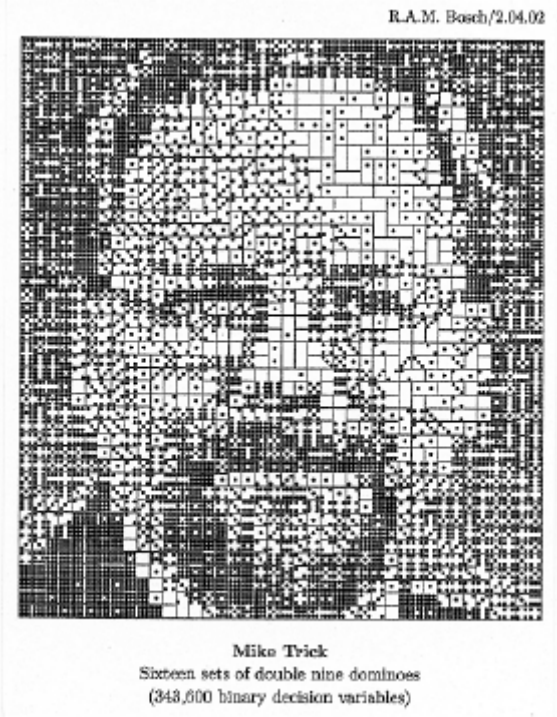
I did my undergraduate degree at the University of Waterloo in a combination of Computer Science and Mathematics, and my first experience of OR was when I did a project on Nurse Scheduling with Rick Burns [a faculty member then at the University of Waterloo]. What a liked about it was the interaction of maths and computing in solving a real-world problem.

Who are your OR heroes (other than Min and Max)?

Who are the people I admire? There are so many, but the three that first come to mind are Don Ratliff and George Nemhauser, both from Georgia Tech and Tom Magnanti from *MIT. Not only are they top notch theoretical researchers but they also have a strong focus on applications.*

Why did you choose to come to New Zealand and take up the hood fellowship?

I had a year off, and was thinking of going to Germany, as I wanted my 3 year old son to learn another language. But as my wife, though a German herself, was a little hesitant, we, instead, wanted to find a place that was reasonably exotic, but still had some serious OR going on. Auckland fit the bill! Once I had decided to come here, Dave Ryan suggested that I take up the Hood fellowship.



Mike Trick
Sixteen sets of double nine dominoes
(343,600 binary decision variables)

You've been involved in a wide range of projects over your career; which have you found the most fulfilling?

There are two that come to mind, the first is scheduling Major League Baseball. I remember sitting in a bar watching a game and feeling that they were playing because I told them to – they were playing my schedule. The other was working with the US Postal service, seeing my vision for the model be implemented, which lead to savings of billions of dollars, and it has had a big influence on the strategic direction of the Postal Service.

During your time in the OR community you must have witnessed a lot of progress, are there any defining moments that stand out for you, that have advanced OR the most?

Without a doubt, the development of CPLEX has had a huge impact; its creation gave the assurance that any LP and most integer programs could be solved in a reasonable time. This created a huge industry for OR, as the much more practical problems could now be solved. The other advancement was the development of Branch and Price methods; these were first put into practice with the Airline industry. As there were huge costs savings that could be made, there was a strong practical value in employing these techniques in industry.

You've been a proponent of the 'Science of Better' Campaign, do you believe that industry is embracing OR as much as it could?

No, not as much as it could, but OR is being used a lot, often not under the name OR. For example there has been a lot of work done in the fields of computational marketing and supply chain management. We are seeing the usage of operations research techniques increasing, but there is still room for tonnes of improvement.

As both data and computing power continue to increase, can (or should) OR exist as a standalone discipline, or is it better that specific operations research principles be incorporated within various industries.

It's not really an either-or, there's a role for both groups. As I said earlier, there is already much use of application-specific OR under different names. However, we still need to keep the identity of OR as a standalone discipline to avoid the situation where disparate groups are rediscovering the same things.

We often hear that Government institutions are inherently inefficient. Can OR play a role in increasing efficiency within the public sector, or is the free market the only solution?

Yes, there is a big role OR could play within government institutions. However, one of the problems is that when OR first came about its main focus was on manufacturing and logistics, and this has continued. The issue is that governments don't manufacture, they provide services. OR needs to think about providing services, so that it can be utilised more within government organisations.

Recently there has been some growth in the field of 'soft OR', a kind of science of good decision making in a more qualitative rather than quantitative framework. Should practitioners be pursuing this line of research more or less aggressively?

This is a difficult question for me, as the US doesn't have this separation between soft OR and hard OR. I think of it as problem identification and problem resolution; I find that we, in hard OR need to focus more on the problem identification side of things, rather than just looking at solving problems, because we need to ensure we are solving the right problems, and that seems a strength of 'soft OR'.

Anthony Downward

There would have been enough space for your contribution here!

Meetings Calendar

New Zealand

Modelling Competition in Supply Chains
Auckland, New Zealand, 28 November 2007

42nd Annual Conference of the Operational Research Society of New Zealand
Auckland, New Zealand, 29 – 30 November 2007
www.conference.orsnz.org.nz

19th International Conference on Multicriteria Decision Making
Auckland, New Zealand, 7 – 12 January 2008
www.mcdm2008.orsnz.org.nz

Asia Pacific

INFORMS Annual Meeting
Seattle, USA, 4 – 7 November 2007
http://meetings.informs.org/Seattle07

IEEE International Conference on Industrial Engineering and Engineering Management
Singapore, 2 – 5 December 2007
http://www.ieem2007.org

19th National Conference of the Australian Society for Operations Research
Melbourne, 3 – 5 December 2007
http://www.asor.org.au/new_conference.aspx

DEA Symposium
Tokyo, Japan, 18-19 February 2008
http://www-sys.ist.osaka-u.ac.jp/hyoka/index.php?DEA2008E for more details

International

Winter Simulation Conference 2007
Washington DC, USA, 9 – 12 December 2007
http://www.wintersim.org

The 7th International Conference on Optimization: Techniques and Application: ICOTA
Kobe, Japan 12—15 December 2007
http://www.iict.konan-u.ac.jp/ICOTA7/index.html

IX International Conference "Approximation and Optimization in the Caribbean"
San Andres Island, Colombia, 2 – 7 March 2008
http://matematicas.univalle.edu.co/~appopt2008/

INFORMS Practice Conference: Applying Science to the Art of Business
Baltimore, Maryland, USA 13 – 15 April 2008

See also http://meetings.informs.org/ for extensive listings of conferences.

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