IFORS NEWS

International Federation of Operational Research Societies

FROM THE EDITOR

Here, there, and everywhere

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

What do personal finance, bus bunching and educating the poor have in common? In this issue, you will find out why "Operations Research" is the answer. Read about how an OR model in Asset Liability Management can be used to manage personal wealth; how an OR methodology has successfully solved a perennial and ubiquitous bus bunching problem; and how OR is helping make full use of scarce resources in running over four hundred schools with some two hundred thousand of the poorest students. It is heartening to note that these applications have come from all over the world: Brazil, the United States and Bolivia, respectively.

OR events are happening in other places too: Antalya, Turkey was the site of the 25th Conference of European Chapter on Combinatorial Optimization. The national OR society of Spain just celebrated its 50th year with a conference in Madrid, graced by IFORS President Dominique de Werra. It is timely to note that SEIO hosts the 2014 IFORS conference in Barcelona. Another society that celebrates its 55th year this year is the Operational Research Society of India (ORSI), which is this issue's featured IFORS member.

This issue also contains the accounts of two IFORS scholars who attended the ALIO and EURO Institutes, geared to provide training and networking opportunities for people at the early stage of their careers. These training happened in Rio Grande do Sul, Brazil and Bremen, Germany.

Looking ahead, do think about attending the ICORD workshop on Problem Structuring Methods (PSM) that will happen in Tunisia this October. Arabinda Tripathy tells us why he believes that PSM is very relevant in tackling development issues.

We have our regular book review section where Hans Ittmann recommends to us Multiple Criteria Decision Making – From Early History to the 21st Century. We also learn from Editor Preston White the current challenges facing the IFORS publication, International Abstracts in Operations Research (IAOR). From the Administrative Committee is a very important announcement about the choice of Quebec as the site for the 2017 IFORS conference.

Indeed, this issue brings you Operations Research in action and in conference sessions around the world - enjoy! 🌐

WHATS INSIDE >>>

IAOR: Continuing to be Relevant

K. Preston White, Jr. <kpwhite@virgnia.edu>

Tempus fugit! Now well into my second year as IAOR editor, I have fairly adjusted to the assignment, but still very much learning the details and embracing the challenges of producing a unique OR abstracting journal. Many thanks again to our outgoing editor David Smith for his willingness to share his time and expertise during my rookie season—staying close at hand long after his intended retirement. David's patience and generosity, together with the efforts and good council of Ros Pyne and our publishing team at Palgrave, have greatly smoothed the transition.

Perhaps our most visible accomplishment is the new cover introduced with Volume 63. Palgrave created the design with input from David Smith and Hugh Bradley. (Hugh, always a marvel, provided a sequence of four prior IAOR covers for reference!) I hope this outward change is paralleled by substantive changes that will be needed to address the changing realities of OR publishing. Peter Bell's insightful discussion of these realities in the March 2012 issue of the IFORS News is a wake-up call and we will have more to say about how these realities are impacting IAOR.

Also new with Volume 63 is IAOR Associate Editor Peter Whitehead's name on the masthead. Formerly a systems engineer on the senior staff at Lockheed Martin, Peter currently is perusing a Ph.D. at the University of Virginia. (Peter was recently awarded a policy fellowship from the American Association for the Advancement of Science and will be continuing his editorial duties while posted at the National Science Foundation this year.) Peter's addition to the team fulfills the original vision for the IAOR selection and classification process, with two sets of eyes now reviewing every abstract.

Behind the scenes, Palgrave completed a major revision of the software used to process abstracts and compile issues. For one who can remember when the processing technology comprised a photocopier, scissors, and a bottle of Elmer's glue, the appearance of the electronic workbench (EWB) certainly was a major step forward. Significant improvements in both layout and speed were achieved in current version, which went live in March 2011. Additional improvements also are under discussion, in response to efficiencies demanded by increased coverage of new journals in the field.

Peter Bell noted in his editorial that, "As the number of new journals expands, IAOR's objective of abstracting all published OR articles becomes increasingly difficult to achieve…[This will] stretch IAOR editorial resources, but at the same time provides a lot of new material and adds to the value proposition of IAOR as a 'one-stop shop' providing an indexed, searchable database of the OR literature." Peter couldn't be more correct. The most challenging issue now facing IAOR is the accumulation of a significant backlog of abstracts awaiting processing—the result of expanding our coverage by more than a dozen journals during my brief term. Adding to the immediate backlog are abstracts for back issues of many of these journals (in some cases covering more than a decade), a great many of which certainly belong in the database.

Our approach to the backlog thus far has been to process abstracts more selectively, in order to remain current with what we believe are the most important and relevant OR papers. Clearly, this approach is stopgap and we are seeking additional editorial resources to expand future issues by as much as 20% for at least the current volume. Growing issues to a nominal 600 abstracts seems a viable approach to reducing immediately, or at least stemming the growth, the backlog. Of course, we are fortunate to have an audience of talented and creative analysts. We very much welcome your thoughts on the present and future of IAOR!

On another note, I'm a systems engineer and my fundamental concern in accepting the editorship was the continued relevance of IAOR. In a world where superb online search capabilities are available to anyone with a web browser, why do I need IAOR? What is the value proposition? To begin to explore this issue, Di Owen at Palgrave procured a small grant to allow Larry Bonzcar (another of our very talented UVA graduate students) to develop a case study. Larry's thesis research involves the applications of discrete-event simulation in healthcare systems. Using precision and modified recall metrics, Larry contrasted the results of several queries on his topic when entered into both IAOR and Google Scholar. Notably, these results were complimentary, with very little overlap in the relevant documents retrieved in response to the same query. If you are interested in further details, please let me know and I'll be delighted send you a copy of the working paper. 🌐

> In a world where superb online search capabilities are available to anyone with a web browser, why do I need IAOR? What is the value proposition?

IFORS 2017

Rendez-vous in Québec City, Canada
July 17 to 21, 2017

Canadian Operational Research Society Wins Bid to Host IFORS 2017

IFORS President, Dominique de Werra, and the IFORS Administrative Committee, are pleased to announce that the Canadian Operational Research Society/Société canadienne de recherche opérationnelle (CORS/SCRO) has been selected as the host society for the 2017 Triennial Conference. The conference will likely be held in Québec City, 17-21 July 2017.

Québec City is a jewel of the French culture in North America, being the capital of the province of Québec and a UNESCO World Heritage Site since 1985. Historic Québec City with its imposing ramparts is the only fortified city north of Mexico, and is a city and a region full of touristic attractions: the old town, the museums, and many natural sites, offering activities for all tastes. It is also home to Laval University and a large and distinguished group of operational researchers and students active in CORS/SCRO, IFORS and other international OR societies.

Québec City is easy to reach from anywhere in the world and will charm you by its people and landscapes; with numerous wonderful restaurants and countless culinary delights, many top-quality hotels and a world-class convention centre. Surrounded by nature's majestic beauty, this city boasts a safe and exceptional quality of life.

Even as the 2014 Barcelona Triennial preparations are heating up, IFORS and CORS/SCRO have started coordination activities across the ocean. 🌍

ESI 2012: A Perfect Port of Call for Updates on Maritime Logistics

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The 2012 EURO Summer Institute (ESI) in Bremen, Germany was a wonderful experience for me. The city of Bremen located in the northern part of Germany is one of Germany's leading logistic regions and home to a large seaport, numerous freight centers and international trade, transport and industrial companies. It was the perfect place to hold the two-week institute, a hybrid academic conference and educational short course on Maritime Logistics.

The Institute successfully fulfilled its mission of bringing together researchers to discuss leading-edge developments in the burgeoning field of Maritime Logistics. Participants, who had to be in the early stage of their careers, (i.e., PhD students or those with less than two years of research experience since attaining PhD) numbered 22. Participants were given 75 to 90 minutes each in which to present their respective research work.

The main organizers – Prof. Dr. Christian Beirwirth and Dr. Frank Meisel – deserve tremendous credit for putting together such an excellent program. A diverse set of research problems was discussed, along with an equally diverse toolbox of methodologies to address them.

The program was broken down into roughly four topics of interest: seaside operations at container terminals, hinterland transportation, yard operations in container terminals, and maritime ship routing. To give a flavor of the discussions, I will focus on two of the topics. Seaside operations address such questions as: How should limited berths and quay cranes be allocated to ships to maximize throughput at a terminal and minimize the time in port for vessels? The answer is not so simple. In addition to the idiosyncrasies in port facility layout and variability in vessel arrival times, seaside operations are closely linked with yard operations, making it difficult to identify an optimal policy for port authorities to implement. Researchers are developing optimization models to obtain robust solutions for this problem and simulation tools to validate their findings.

A second topic of interest addresses problems in ship routing, where even minor improvements can have major impact since maritime transportation constitutes more than 80% of world trade by volume. Much like bus services do for their riders, liner shipping companies like Maersk must publish itineraries for their customers specifying the precise time a ship will arrive at a port to load or unload containers. Designing such a network to guarantee reliable service and maximize profit is a formidable task and is being tackled only now with advanced optimization techniques. For those who are familiar with the multi-commodity network design problem, the liner shipping variant is even more challenging as real-world flexibility and constraints give rise to monolithic models. Meanwhile, a closely related problem affects vertically integrated companies who must synchronize ship routes with distribution of bulk products. Decision support tools to minimize transportation and operational costs of routing ships while ensuring that supplier and customer inventory levels are maintained are becoming more common as margins dwindle.

The participants not only learned from each others' presentations, but also were given the privilege to hear lectures from professors coming from Europe who are all experts in their respective fields: Stefan Voss, Rommert Dekker, Iris Vis, and Kjetil Fagerholt. On two separate occasions, we ventured out from our quaint meeting room overlooking the Weser River to take excursions to nearby container terminals in Hamburg and Bremerhaven. There, we observed firsthand various port operations and discussed pressing economic and logistical issues faced by the terminals in order for them to stay competitive with other European ports.

> Though coming from five continents, the participants immediately found a common ground in their research topics. This made it easy to socialize in a more informal setting at the end of each day.

While the excursions and guest speakers were very instructive, by far the most valuable part of the conference was the opportunity to meet other researchers from around the world. Though coming from five continents, the participants immediately found a common ground in their research topics. This made it easy to socialize in a more informal setting at the end of each day. All in all, the ESI was a very rewarding experience. I strongly encourage other young researchers to apply for future ESIs in their research area. I am sincerely grateful to IFORS for providing financial support for my travel costs and to EURO for putting together this event. 🌍

INFORMS Announces Thirteenth Annual Case Competition

INFORMS is pleased to announce its 13th Annual Peer-Reviewed Case Competition. The competition is jointly sponsored by the INFORMS' Education Committee, INFORM-ED (the INFORMS Forum on Education), and INFORMS Transactions on Education (INFORMS free access online journal devoted to issues in ORMS education). It is designed to encourage the creation, dissemination, and use of new, previously unpublished teaching cases in operations research and the management sciences.

Prizes include a $500 and plaque to the best case, and $100 and plaque for up to three runners-up. The winners of the 12th Annual Case Competition Results and Finalists were Anton Ovchinnikov and Samuel E. Bodily of the University of Virginia for Chandpur Enterprises Limited, Steel Division. Other finalists were Alaina Hession and Jonathan Caulkins of Carnegie Mellon University for Harry Potter and the Sorting Hat: Math Versus Magic, and Matthew J. Drake of Duquesne University and Ozgun Caliskan Demirag of Pennsylvania State University-Erie for Forecasting Offertory Revenue at St. Elizabeth Seton Catholic Church. For a list of the winners of all twelve past Case Competitions, go to http://www.informs.org/Recognize-Excellence/INFORMS-Prizes-Awards/Case-and-Teaching-Materials-Competition.

All submissions and supporting documentation are due by August 15, 2012. All cases will be reviewed in late August by a panel of judges who are familiar with the case teaching method. Up to four finalists will be selected and notified by the Chair of the Case Competition by September 5, 2012. Each finalist (or group of finalists, if a case selected as a finalist has multiple authors) will give a thirty-minute presentation of her/his/their entry in a special open session of the 2012 INFORMS Annual Meeting in Phoenix AZ. The panel of judges will select the winning entry from these finalists based on these pre-sentations and submitted material. While a finalist does not have to be a member of INFORMS, she/he must present her/his case at the Fall 2012 INFORMS Meeting to be eligible to win. Note also that all submitted cases must be previously unpublished. Cases should be essentially new in their entirety. If the case contains material drafted originally by individuals or groups other than the author(s) submitting the case, then the intellectual history and ownership of these portions should be made absolutely clear. Contestants are responsible for assuring that this guideline is strictly met.

A complete submission package should include:
(1) One electronic copy of a short (250 - 500 words) abstract, the case and teaching notes sent in a zipped file. The abstract should appear by itself on the second page and identify the industry, business issues, technical issues, pedagogical objectives, and suggested uses of the case. The case, any exhibits, and then the teaching notes should follow. The case should be a maximum of 10 pages (8.5" x 11.0") single-spaced (maximum of approx. 3000 words); exhibits are in addition to page limit, and shorter cases are acceptable. The teaching notes should be of length as necessary to provide an instructor with sufficient support to use the case in a classroom. A 12-point proportional font (such as Times New Roman) with 1-inch margins should be used for all submitted documents.

(2) A completed Case Competition Form.

These documents should be submitted directly to 2012 Case Competition Committee Chair Palaniappa Krishnan (University of Delaware) at baba@udel.edu. You can also contact Professor Krishnan for more detail by email or by telephone at +1 302 584 7344. 🌐

EURO 2012

25th European Conference on Operational Research
8-11 July 2012
Vilnius, Lithuania

Conference URL:
http://www.euro-2012.lt

APORS 2012

9th Triennial Conference of the Association of Asia-Pacific Operational Research Societies

OR: Innovation & Development

July 28-30, 2012
Xi'an, China

Conference URL:
http://apors2012.csp.escience.cn

CLAIO SBPO

Congreso Latino-Iberoamericano de Investigación Operativa

Simpósio Brasileiro de Pesquisa Operacional

September, 24-28 2012
Rio de Janeiro - Brazil

Conference URL:
http://www.sobrapo.org.br/claiosbpo2012/

ELAVIO 2012: A Distinct Learning Experience

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ELAVIO 2012 was an entirely new experience for me from start to finish. I have attended other conferences before, but this time, I was encouraged to share a room with two roommates, which meant that all participants needed an open mind to ensure that they enjoyed every moment of their experience.

The selected place for the school, Vale dos Vinhedos, was outstanding. The good weather, good location, calm and quiet all worked together perfectly to make meeting new people and learning new lessons a pleasurable experience. I don't know how the organizing committee could have done better; though I have not been to other ELAVIOs, it is obvious that this one has benefited from the lessons learned from the previous Institutes.

Each day featured an unparalleled training experience, which featured guided visits, social meetings, scientific sessions, and outstanding plenary speakers punctuated with wine, history, friendship and science at a beautiful place. All told, however, the most important aspect of ELAVIO for me were the people I met.

My fellow participants were all OR enthusiasts and I was gratefully surprised with their interest in my presentation though I dealt with a topic that was not common to this ELAVIO. Almost 90% of the presented works were related to combinatorial optimization, metaheuristics and its applications, which have a wide applicability in logistics and manufacturing. I enjoyed most the lecture by Cristobal Miralles, who spoke about ethics in OR. It was a great experience to understand how sciences, the quest for profits, and OR do not necessarily give good results in the absence of ethics.

This experience showed me that publishing papers and applying OR theories could have more meaning and impact when accompanied by social meetings and sharing of experiences that happen in good conferences, good events, visits of experts, research stays, and exchange of scholars within the OR international community.

Finally, I would like to thank IFORS for giving me the opportunity to attend ELAVIO 2012. Special thanks to the organizers and volunteers Luciana Buriol, Gaston Notte, Cristobal Miralles, Renny Márquez, Emanuel Delgadillo, Federico Pousa, Sergio Varcarcel and all my new friends who made ELAVIO 2012 one unforgettable experience for me.

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Antalya hosts the 25th Conference of European Chapter on Combinatorial Optimization

Serap Ulusam Seçkiner <sermarko@yahoo.com>, **Gerhard-Wilhelm Weber** <gweber@metu.edu.tr>

The 25th Conference of European Chapter on Combinatorial Optimization (http://www.eccoxxv.org/) was held in Antalya, Turkey, from April 26 to 28, 2012. About 200 delegates from Europe engaged in a three-day lively discussion and debate on experiences in solving real-world combinatorial optimization problems, discussing recent advances in theory and applications, as well as reporting on development and implementation of appropriate models and efficient solution methods for combinatorial optimization problems. The conference provided a forum for researchers and practitioners to show their work on combinatorial optimization to the broader scientific community, to identify challenging research problems and promising research areas in theory and practice, and to interact with researchers in other related fields.

With its main goal to present the most recent issues and advances in all applications of combinatorial optimization, this year's event was organized by Professors Silvano Martello, coordinator of European Chapter on Combinatorial Optimization and Gerhard-Wilhelm Weber, a member of the Middle East Technical University, and Izmir University of Economics members Refail Kasımbeyli and Arslan Örnek. Prominent Turkish and foreign guest speakers participated in the congress and shared their knowledge and experience by providing updates on theory and applications in combinatorial optimization. >>

G. Weber, Arslan Örnek and Silvano Martello open the Conference.

>> Specific topics covered in the conference included applications of combinatorial optimization in logistics and supply chain management, manufacturing, energy production and distribution, telecommunications, bioinformatics, finance, discrete and hybrid dynamical systems, and other fields, exact solution algorithms, approximation algorithms, heuristics, and meta-heuristics for combinatorial optimization problems, graph theory and network flows, integer programming, global optimization, stochastic integer programming, and multi-objective programming.

The congress also met the challenge of presenting and closely examining issues and views that affect combinatorial optimization techniques in the context of rapidly evolving developments in practice and technology. During the conference plenary lectures, Professor Miguel Anjos, Mathematics and Industrial Engineering & Gerad, Ecole Polytechnique de Montreal, Montreal, Quebec, Canada, lectured on the relationship between semidefinite optimization and combinatorial optimization. Professor Bernard Ries, Lamsade, Université Paris-Dauphine, Paris, France, discussed why some vertices/edges are more important than others. In the last plenary talk, Professor John Shawe-Taylor, Department of Computer Science, University College London, United Kingdom, talked on "adapting representations for specific tasks" by Machine Learning in OR.

Miguel Anjos delivers his Keynote Lecture.

The two sightseeing tours, one to the ancient cities of Aspendos and Perge and the other one to the Old City of Antalya, capped the excellent conference program. Acknowledging that many from Germany and Europe do have a particular affinity to the fascinating and vibrant region of Antalya, G.-W. Weber mentioned, in his opening address at the conference, "There are three words in Turkish which sound almost the same and have almost the "same meaning":… Antalya, Alanya and Almanya".

For Prof. Dr. Serap Ulusam Seçkiner, this conference was a special experience, in particular, because of her organization of a new and innovative stream in the area of ECCO and EURO "Combinatorial Optimization in Ergonomics". The success of the conference owes a lot to the members of the Organizing Committee: Refail Kasımbeyli, Arslan Örnek, Ugur Eliiyi, Deniz Türsel Eliiyi, Zeynep Alparslan Gök, Sinan Gürel, Erdinç Öner, Özgür Özpeynirci, Selin Özpeynirci, Basak Akteke Öztürk, Zeynep Sargut, Yesim Aydın Son, Ahmet Tokgözlü, Gürkan Üstünkar, and Kasirga Yıldırak. The group from Izmir, the company of Dr. Arber, Ankara, the sponsors and collaborating institutions deserve special mention.

ECCO XXVI will be held in Paris in 2013. The European OR community continues to be proud at being a part of this event that has consistently delivered quality meetings for the last 25 years. 🌐

G Weber enjoys the gala dinner with the main organizers from Izmir.

TUTORIALS

Scheduling Self-Coordinating Buses

The problem: bus-bunching

Buses tend to bunch. This is because inevitable disturbances will cause one or more buses to fall behind the others, and any large gap tends to grow because the trailing bus must serve more passengers and so will be further delayed. Large gaps get larger, and small gaps get smaller, with the result that riders experience long waits, after which several buses may arrive together.

Schedules have only limited ability to resist bunching. If a disturbance is sufficiently large, such as a bus breaking down, severe bunching will occur as a schedule is unable to recover any regularity of service.

Bunching is the most frequent complaint about any urban bus system, as a web search on "bus bunching" will confirm.

A solution

Abandon the schedule! A schedule is merely a goal and in practice it is hard to achieve. Anyway, no one cares about a schedule as long as the gaps between buses (that is, the headways) are small, as in a busy urban bus system. Instead, control headways by strategically delaying buses at the ends of the route or at special locations such as transfer points.

Don Eisenstein (University of Chicago) and John Bartholdi (Georgia Tech) have devised a new way of computing the delays so that headways tend to equalize, without management direction or driver intention. Furthermore, they have confirmed its performance on a real bus route and have built a software system that will run the bus route full time later this year.

One of the Georgia Tech buses mounted with a tablet which recognizes when the bus has arrived at a control point, computes the time to wait, and then signals to the driver when it is time to resume driving.

Actual headways are determined by local traffic conditions and are not under the control of the bus manager, so it makes sense to abandon the idea of a target headway and focus on equalizing headways. >>

From l to r: John Bartholdi, Alexandra Gaigelas (student leader for project implementation) and Don Eisenstein all set to take the bus sans the long wait.

How it works

The main component of their scheme is this: When a bus arrives at one end of the route, it looks at the bus immediately following and estimates the time until its arrival. Then it performs a simple calculation that determines how long to pause. This pause changes the headway of the newly arrived bus to an average of its former headway and the former headway of the following bus. If its former headway was larger, its new headway becomes smaller, and vice versa. The result is that headways are constantly adjusted to become more nearly equal.

Bartholdi and Eisenstein built an idealized model that shows how the headways of the buses change under their method of determining how long buses should pause. The change of headways is described by a simple, finite, irreducible Markov Chain, whose convergence is of course guaranteed by the Markov Chain Theorem. Convergence within the model suggests resistance to bunching in real life, and such has proven to be the case. (Details appear in their technical paper, which recently appeared in Transportation Research B.)

The scheme requires only a tidbit of local information – the estimated time until the next bus arrives – but this is sufficient to coordinate all the buses on the route: The relative positions of the buses will be adjusted to be more evenly spaced, so that no one has to wait too long for a ride. Moreover, this technique works without knowing a map of the route or even the number of buses. Without changing operations or processes, buses can be added or removed from the route at any time; the route can be changed (for example, to detour around construction); and bus stops can be inserted or removed. After any such change the headways will autonomly re-equalize.

Success on a real bus route

There is a large and admirable academic literature on bus coordination, none of which seems to have been tried in practice. This is understandable: Managers of public transit systems are highly reluctant to experiment, as it is very costly to interrupt a core service on which so many customers rely. The simplicity of this scheme was important in "selling" it to management.

Thanks to the bravery of David Williamson and Aaron Fowler of Georgia Tech's Department of Parking and Transportation, the Bartholdi/Eisenstein scheme has been tested extensively on the central bus route that carries over 5,000 riders a day through the heart of the Georgia Tech campus. The results were clear: Average headways were smaller so there was less wait for a bus. And there was less variability in headways, so service was more reliable.

More importantly, tests confirmed the ability of the scheme to respond to large disturbances. In one experiment, they removed one bus from the route, leaving a large gap in service. Under a scheduled system, such a gap would tend to grow, but under the Bartholdi/Eisenstein scheme the headways of the remaining buses spontaneously re-equalized, thereby re-establishing regular service without intervention by management or even awareness of the drivers.

Implementation

Georgia Tech students, working with the GT Department of Parking and Transportation, have built a software system based on Bartholdi and Eisenstein's control scheme in which each bus contains a tablet computer with GPS and wireless networking capabilities. They have been conducting live trials for several months and held a public demonstration on 20 April 2012. The new system is expected to be fully operational by Fall 2012.

> Managers of public transit systems are highly reluctant to experiment, as it is very costly to interrupt a core service on which so many customers rely. The simplicity of this scheme was important in "selling" it to management.

To learn more

Please see http://www.isye.gatech.edu/~jjb/buses/buses.html and the FAQ therein for more information and for a link to the published article.

Thanks

Frequently Asked Questions

Don't buses already have GPS installed? How is this different?
Yes, most buses have Global Positioning Systems (GPS) installed. But our scheme does much more than simply track locations of the buses: Our contribution is a mecha-nism that automatically adjusts the positions of the buses so that they are equally spaced in time; that is, they arrive with the same headway (time between arrivals). This provides the best service and gets maximum use from each bus.

What is special about this method of headway control?
Its simplicity and practicality. As far as we know, ours is the only scheme in a large aca-demic literature that has actually been tested on a real bus system. Public transit is not an experimental science and managers of transit systems are understandably reluctant to try out new schemes, but our approach is easy to understand and easy to try.

Is this scheme suitable for routes with long average headways?
Probably not: Research has shown that people want a schedule if headways are longer than 10-12 minutes.

Won't passengers be annoyed if the bus waits at a control point?
We recommend choosing endpoints of the route as control points because there will generally be no on-board passengers. Otherwise, a good choice of control point is any bus stop where passengers can change to other transportation, such as other routes or trains. At such stops passengers generally appreciate the waiting time, which increases their opportunities to make seamless connections.

Where should control points be located?
The ends of an out-and-back route are natural locations for control points, because buses can pause there without delaying in-transit passengers. Other natural locations are wherever the route intersects with other transport modes, such as train or other bus routes.

How many control points should there be?
There is a tradeoff: More control points provide more assertive control; but buses pause at each control point and so more control points mean more idle bus capacity. There is no right answer but rather a management decision. Fortunately, it is easy to experi-ment.

How do you schedule breaks, lunch, end-of-shift, etc. for drivers when there is no bus schedule?
Because the buses have no schedule under our scheme, the drivers have no schedule either. This means that the drivers must be flexible. (Scheduled services have the same problem because it is impossible in practice to keep to a schedule.) This is not so much a technical problem as one of driver expec-tations and management. This has not caused any significant problems on the Georgia Tech route: the drivers have been very cooperative. It might be a problem on routes that require a very long time to circumnavi-gate.

If there is no schedule, how is the performance of a driver judged?
Instead of managing by schedule adherence, we manage by wait-time adherence: Our system reports how well each driver follows instructions about when to depart the con-trol points. (Other issues, such as safe driving, courtesy, etc. remain the same.)

Can't a driver game the system by traveling as fast as possible so that they get a longer break at the next control point?
Yes, but this is a management problem and is easily recognized from the recorded logs of bus positions. Anyway, a driver can do this under a scheduled system too.

What do the drivers think of this scheme?
Georgia Tech drivers have been very cooperative and claim to prefer this scheme, be-cause it removes the constant pressure of schedule adherence.

Isn't dynamic headway control an old idea?
Others have suggested various schemes to adjust the headways, but we have seen no other scheme of comparable simplicity and practicality. Indeed many others seem wildly impractical, assuming, for example, perfect knowledge of instantaneous bus locations and velocities and passenger queues and arrival rates.

How is this different from time frequency scheduling , such as is used on the DC Circulator?
Time frequency scheduling is the setting of a target headway (rather than a target schedule). It is a step in the right direction but still suffers from the problem that, except in unusual circumstances, the system manager cannot control traffic velocities. It is fine to have a target headway, but the question is whether it can be achieved. It is not enough to show the drivers where the other buses are, and expect them figure out how to fix problems. Our system abandons target schedules or headways as distractions, and focuses on the essential: that headways be as nearly equal as possible. Further-more, no one has to figure out how to fix an imbalance because headways equilibrate spontaneously. (Incidentally, the DC Circulator uses a schedule; the schedule, however, is not published.)

You have proved a theorem that shows convergence to a common value of headway, but this theorem describes an idealized set of buses. What does it mean for the real world?
Because of inherent and ineradicable variability in traffic velocities, we do not expect re-al buses to achieve exactly equal headways. Instead, we interpret the theorem to mean that our scheme resists bunching. We expect that bus headways will vary less under our scheme than under a schedule and that gaps in service will not tend to grow, as they do under a schedule.

The mathematics shows that our scheme will continue to resist bunching as long as the forecasts are not both wildly and frequently inaccurate.

How does bus capacity affect this scheme?
Our scheme is independent of bus capacity. But, as for any other system, if buses are regularly full, additional buses are probably needed.

A Tutorial on Asset Liability Management

Tara Keshar Nanda Baidya <tarabaidya@yahoo.com.br> , **Giuliana Romani** <giuliromani@gmail.com>

The first author was invited by a big energy company in Brazil to co-ordinate an Asset Liability Management Project. The objective was to develop a model to help its executives make decisions that could minimize the cost and risks of borrowing, which amount to hundreds of billions of dollars. The company needs to choose the source of bor-rowing and the type, timing and terms of debt to use within a multi period framework. Contributing to the difficulty is the uncertainty of important variables such as, the price of oil and its derivatives (like kerosene, gasoline, diesel, and liquefied gases); the interest rate for different currencies in various international financial markets; and the exchange rates among different currencies. Since they are ran-dom variables, they can be described using a scenario tree. This prob-lem requires a multi period model that emphasizes the need to meet liability in each period for a finite horizon (e.g., 50 years). Since the values of both assets and liabilities are random in nature, a stochastic programming approach is used.

What is ALM? Asset and Liability Management (ALM) is a risk man-agement method that meets the financial goals of the organization such that risk exposure is minimized, at the same time taking into account the appro-priate combination of assets and liabilities. ALM models have been developed for fi-nancial institutions, pension funds, insur-ance companies, banks and investment funds, with each one having its own finan-cial objectives and application areas. For example, most insurance companies use it for long term financial planning, while the capital market traders use it for day-to-day decision-making. In both cases, the asset liability management models maximize shareholder's (or investor's) wealth by matching assets and liabilities. The differ-ent tools used to manage assets and liabili-ties are chosen according to the needs of these institutions. >>

ALM models are also applicable to personal finance. Like financial institutions, an individual investor would have his/her objectives and obligations, and therefore, should make investment decisions that take into consideration the risks involved in an uncertain environment in order to achieve financial objectives, which may include, among others, sufficient funds for retirement or funds to cover children's education. Many investors do not do this type of planning because of the complexities involved. The ALM model requires a great number of calculations – at each stage of the planning horizon, values of the decision variables for each event needs to be computed using the stochastic optimization model. Despite its complexities, ALM is an important tool for individual investors. This paper will seek to explain some facets of the model.

ALM for Individual Investor. Individuals have many financial goals, which may include: purchase of a house and a car; acquisition of pension plans; investment for the education of children, and others. Objectives vary with the situation of the investor, e.g., a couple who just had a baby may be concerned about saving for university tuition while a middle-aged couple may be looking at preparations for retirement.

Individuals should plan their strategy of savings, investments and borrowing by taking into consideration future uncertainty. As returns on stocks, bonds and other assets are uncertain, so also are liabilities. For example, an investor who is saving part of his salary to buy a house three years from now is faced with the uncertainty of the future price of the house, which may be affected by inflation and other market and economic factors that affect supply and demand for housing in the local and global markets.

How should an individual investor manage assets and liabilities? The primary step is to describe the time horizon, the specific financial goals and the amount available. To meet the investor's goals, it is usual to determine which assets and quantities of each needs to be held at each period $(t = \{0, 1, 2, ..., T\})$. The investor usually maximizes the expected utility of wealth at the last period T (end of the planning horizon). Many times, it is assumed that the utility function is linear in wealth. At the beginning of each period, the investor needs to make decisions about the asset portfolio and the liabilities he holds. However, there are a lot of uncertainties that need to be taken into consideration. For example, liability at each period $(L_t \, ; \, t = 0, 1, 2, ..., T)$ is random in nature, but can be described with a probability distribution. Therefore, the decision problem is multistage, dynamic and stochastic and, consequently, can be formulated using a stochastic programming model.

The model that we describe below is based on the work of Consiglio, Cocco and Zenios (2002). These authors developed a software that uses financial engineering to optimize the financial planning process. It is based on a scenario optimization model that specifies the allocation plan for each asset using the amount available while considering the risk tolerance of the investor, in order to reach the financial goals specified.

Model Structure: The variables we use in the model are the following:

1. Decision variables:

   x_i = Number of shares of the asset i the investor holds if he has only \$1 to invest in all the N assets.

2. State variables:

   R_{Pt}^s = Portfolio return at period t in scenario s,

   y_{+t}^s = Variable used to measure the surplus over the target,

   y_{-t}^s = Variable used to measure the shortfall over the target.

3. Stochastic parameters:

   $r_{i,t}^s$ = Return of the asset i at period t in scenario s,

   W_t^s = Total salary at period t in scenario s,

   g_t^s = Liability growth rate at period t in scenario s.

The objective function of the model, in the present case, is to maximize the expected value of the surplus at the end of the planning horizon (T), which is:

$$\text{Maximize} \quad E(U_T) \tag{1}$$

where U_T is the accumulated surplus at the end of the planning horizon. At each period of time t and scenario s, the surplus U_t^s depends of the capitalized surplus value at the time $(t-1)$ plus the surplus value at the period t scenario s. It can be formulated mathematically in the following manner:

$$U_t^s = U_{t-1}^s \left(1 + r_{f(t-1)}^s\right) + u_t^s \tag{2}$$

where:

r_{ft}^s = Short term interest rate at the period t scenario s

u_t^s = Surplus value at the period t scenario s, which is given by

$$u_t^s = \max[(R_{Pt}^s - g_t^s), 0] \, L_{t-1}^s \tag{3}$$

When maximizing $E(U_T)$, we need to take care of the following constraints:

I.   Risk Exposure Constraint: $E(D_T) \leq \omega$

This constraint specifies the investor's risk exposure limit, indicating the maximum level that the investor supports the deficit in relation to the final wealth, where D_T is the total deficit at the end of the planning horizon (T). For any time period t,

$$D_t^s = D_{t-1}^s \left(1 + r_{f(t-1)}^s\right) + d_t^s \tag{4}$$

D_t^s = Total deficit value at the time t and scenario s.
d_t^s = Necessary value to cover the deficit at the period t scenario s, which is given by

$$d_t^s = \max[-(R_{Pt}^s - g_t^s), 0] L_{t-1}^s \tag{5}$$

The deficit and surplus equations can also be written in the following manner:

$$d_t^s = L_{t-1}^s y_{-t}^s \tag{6}$$

$$u_t^s = L_{t-1}^s y_{+t}^s \tag{7}$$

for every t = 0, 1, 2, ..., T and every scenario s ∈ Ω.
where: y_{+t}^s = Variable used to measure the surplus over the target

y_{-t}^s = Variable used to measure the shortfall over the target

II.   Budget Balance Constraint: $R_{Pt}^s - g_t^s = y_{+t}^s - y_{-t}^s$

This constraint implies that the difference between the portfolio return and the liability is either a surplus or a deficit.

III.   Portfolio Constraint: $R_{Pt}^s = \sum_{i=1}^N x_i r_{it}^s$

This constraint defines the portfolio return.

IV.   Capital Investment Constraint: $\sum_{i=1}^N x_i = 1$

This constraint is used to ensure that all capital available will be invested

V.   Non negativity Constraint: $x_i \geq 0$

The final constraint ensures that there will be no negative investment.

The resulting model can be summarized in the following way:

ALM Model for Individual Investors

Maximize $\quad E(U_T)$
x_i (1)

subject to

$$E(D_T) \leq \omega \tag{I}$$

$$R_{Pt}^s - g_t^s = y_{+t}^s - y_{-t}^s \tag{II}$$

$$R_{Pt}^s = \sum_{i=1}^N x_i r_{it}^s \tag{III}$$

$$\sum_{i=1}^N x_i = 1 \tag{IV}$$

$$x_i \geq 0 \tag{V}$$

>> It is important to realize that there are no guarantees that the investor's goals will be achieved under all circumstances. According to Consiglio, Cocco and Zenios, the goal can be too ambitious or the available amount too low or the expected return not high enough. A continuous analysis of the results should be done to validate the possibility to accomplish the investor's financial goals. 🌐

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OR FOR DEVELOPMENT SECTION

Problem Structuring Methods: A Tool for Development ·····················

Arabinda Tripathy <tripathy44@rediffmail.com>

It has been almost 20 years since I co-chaired with Prof. Jonathan Rosenhead the first International Conference on Operational Research for Development (ICORD). Held in December 1992 at the Indian Institute of Management Ahmedabad (IIMA), India, the conference was preceded by a two-day workshop on Problem Structuring Methods (PSM). The fact that IFORS is organising a workshop with the same theme 20 years after (October 12-13,2012 in Tunisia – Please see the Call for Participants) highlights the continuing relevance of PSM for development.
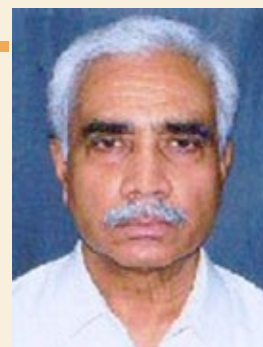
The year 2012 started well from the perspective of OR in Development. The first international meeting by the newest IFORS member,

🔺 People formed long lines to get their share of cooking gas.

the Operational Research Society of Nepal (ORSN) was held in February 2012. (See March 2012 issue of the IFORS News.) In the true spirit of OR, the organisers took the effort to ensure participation by representatives from various disciplines and to get the support of professional bodies related to OR. The other important aspect of the conference, especially for international participants, is a first-hand experience with various developmental issues, most specifically that relating to energy. The electricity and petroleum fuel shortage presented a grim picture and highlighted some issues in development. Involving economic, social, political, technical, financial, and other aspects, the problem is complex and has no quick or easy solution. A rational analysis can best be done by employing some form of PSM. An operational research body can play an effective role in bringing into focus such issues as those faced by Nepal and other developing countries. Along this line, IFORS can do a great service by looking into the formation and reactivation of OR societies in developing countries.

In addition to energy, another area that needs to be addressed in the context of development and developing countries is higher education. Almost all developing countries are committing substantial amounts of resources for higher education. There is also an increasing trend towards privatisation of higher education. It is hard to convince oneself of the success of these efforts in meeting the objective (even in its narrowest form) of increasing knowledge level and broadening the horizon of participants going through the system. While the regulatory mechanism and the role of the state are very important in the context of education, specifically higher education, the practices at the unit level make significant contribution. Very few higher education institutes in developing countries offer good academic programmes. Various stakeholders have different perceptions and even different objectives, resulting in not so desirable outcomes. Soft OR and PSM have the power to bring about desirable changes in higher education, as some experiences suggest. The ICORD workshop in October 2012 could potentially provide a forum for discussion and action on the subject.

Another area capable of significantly impacting the development process is Corporate Social Responsibility (CSR). CSR is treated as an image building exercise that involves a lot of money with little results to show for it. PSM can definitely make CSR initiatives realize their full potential.

Surely, the more widespread use of Problem Structuring Methods can be an effective platform for attaining development through OR. The IFORS initiative to conduct the PSM workshop is a step in the right direction. 🌐

> ...the more widespread use of Problem Structuring Methods can be an effective platform for attaining development through OR.

INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES

ICORD WORKSHOP
THEME : PROBLEM STRUCTURING METHODS

OCTOBER 12-13, 2012
@ DJERBA ISLAND, TUNISIA

BACKGROUND

Since 1992, IFORS has organized a series of International Conferences on OR for Development (ICORD), approximately every three years. It has now been decided to hold ICORD conferences on a regular basis in conjunction with the IFORS Triennial Conference.

In addition, and in order to enhance continuity and interest in the field, IFORS is now launching an additional program to conduct workshops in non-IFORS Conference years, to be held across IFORS' different regions. The hope and intention is that representatives from these workshops will make presentations at the subsequent ICORD Conference.

The aims of the new structure are to achieve:
• a greater momentum for the OR in Development programme through greater frequency and visibility of actions;
• an improved focus for OR in Development activities on selected problem-oriented themes.

2012 ICORD Workshop

The 2012 ICORD Workshop will be held on Djerba island, Tunisia. Located south of Tunisia, Djerba is famous for its excellent white sandy beaches, blue sea, dramatic sunsets, and rural Mediterranean farms. The island is surrounded by many small islands where the only inhabitants are birds and is a popular tourist destination.

PROGRAM

The Workshop is designed to follow on from the ROAD Conference on October 11th (http://road2012.logiq-giad.org/). Separate registration is required, and places on the Workshop are limited. Some of the sessions will be open to ROAD participants. The language of the workshop is English.

The program will be limited to 30 participants. Acceptance onto the program will be based on applicants' previous, current or intended involvement in the area of OR for development. The purpose of the workshop is to help participants in strengthening their capacity to work effectively on development-related problems

The workshop is designed to introduce workshop members to Problem Structuring Methods, and give guidance on how they can be applied to problems with a development context. Tuition will be by a mixture of exposition and case exercises. Participants will be asked to contribute an example of a development issue or problem relevant to their own country and situation, which may be chosen for discussion at the workshop.

Participants will be introduced to methods that help deal with problems arising from the nature of under-development, and of the development process. The limitations of more traditional OR methods in this context will be discussed.

The Problem Structuring Methods to be covered in some depth are Strategic Options Development and Analysis (SODA) and Soft Systems Methodology (SSM). In addition there will be some coverage of the Strategic Choice Approach, and Robustness Analysis.

Participants will find it useful to obtain Rosenhead and Mingers (eds) Rational Analysis for a Problematic World Revisited, Wiley, Chichester UK. Other reading will be supplied during the workshop.

PROGRAM LEADERS

The principal tutors for the Workshop are Mike Cushman and Professor Jonathan Rosenhead of the London School of Economics, and Professor Leroy White of the University of Bristol.

APPLICATIONS

Please submit your curriculum vitae together with a letter explaining how you feel that the workshop could be useful to your teaching and/or practice no later than July 30, 2012 to:

Youssef Masmoudi
E-mail: youssef.masmoudi@gmail.com
Mobile: 00216 23269550

E-mail submissions are acceptable. Selected participants will be notified by August 5, 2012.

A year after winning the IFORS Prize
A decision-support methodology for increasing school efficiency in Bolivia's low-income communities: An update

João Neiva de Figueiredo, Miguel Angel Marca Barrientos

This article relates what has happened a year after the IFORS Prize for OR in Development was bestowed in July 2011 during the 19th IFORS Conference in Melbourne on the paper entitled "A decision-support methodology for increasing school efficiency in Bolivia's low-income communities". Details of the project are as published in the International Transactions in Operational Research (ITOR, 19: 99-121). The authors would like to formally thank IFORS for sponsoring the OR in Development Prize Competition over the years. As described below, the 2011 award of US$ 4,000.00 was used to continue the project and also served as a source of pride and encouragement to all members of Fe y Alegría: Bolivia in carrying out its mission of providing meaningful education to the marginalized in this poverty-stricken Latin American country.

Fe y Alegría: Bolivia runs over four hundred schools reaching over two hundred thousand of the poorest students in the country and, needless to say, is intensely resource-constrained. Over the past five years, Saint Joseph's University (SJU) and *Fe y Alegría: Bolivia (FyA)* have worked together to develop a DEA-based decision support methodology which enables the objective comparison of schools within the network. This has resulted in the identification and dissemination of best practices and the comparison of in-network schools with other institutions, with the latter confirming the qualitative perception of a highly efficient resource usage.

The project has 5 phases and is currently in Phase IV. Phase I- Exploration (May 2008 to March 2009) started with preliminary testing of the proposed methodology and produced, as its final output, the Data Envelopment Analysis (DEA) prototype. Phase II -Feasibility (March 2009 to May 2010) involved examining the necessary conditions for use of DEA as a tool by FyA and culminated in the SJU donation of software, laptops, and resources to FyA. Phase III -Initial Adoption (May 2010 to Aug 2011) consisted in FyA's use of the methodology to analyze data from Bolivia Central Office school surveys and to compare FyA schools with non-network schools. Phase IV -Continued Adoption (August 2011 until roughly mid-2013) consists of FyA applying the methodology, to be followed by Phase V –Consolidation, featuring the ongoing use of the methodology by FyA with steady-state support from SJU. SJU's Haub School of Business and Office of the Mission have provided financial support throughout the project.

Significant developments since the project won the IFORS Prize follow. First, FyA plans to use the DEA-based methodology to analyze data obtained from an ongoing worldwide FyA Quality Enhancement Initiative, carried out every five years. (Of the 400-plus FyA schools in Bolivia, 163 have taken part in the initiative, the highest number in the 20 countries where FyA operates.) Through very detailed surveys of participating schools, the initiative obtains outcomes of standardized testing in values, languages, and mathematics as well as 123 different quality indicator-related questions answered in each school by teachers, students, school principals, and families. FyA believes that the DEA-based methodology will be useful in systematically understanding, interpreting, and synthesizing the numerical findings.

Second, an effort is under way to disseminate the DEA technique in FyA's regional offices in Bolivia to empower local analysis and add a bottom-up component to the process. In early March, we conducted a DEA training program for personnel engaged in lower-, middle-, and high school education in every Bolivian province (departamento), with emphasis on applying the methodology to local conditions. The training included the theoretical basis of DEA, reinforced with specific examples and real case analyses. All participants had the software installed their laptops, enabling them to run illustrative examples on schools in their own provinces, which they knew very well. The participants discussed broader FyA-based applications and came up with suggestions on other areas that may benefit from the DEA-based methodology.

Third, also in early March, we offered a training program in La Paz that was attended by various members of the education community in Bolivia, including representatives from the Ministry of Education, the Bolivian Quality in Education Observation Committee, several Bolivia-based NGOs, representatives from Jesuit schools in La Paz, as well as selected members of FyA. This training program covered: the history of the joint FyA-SJU project, a theoretical overview of DEA and its usefulness as a technique to help identify efficiencies in an educational setting, and featured a hands-on training in use of the DEA low-capacity software. The attendees' reception of the methodology and expression of strong interest in the methodology and its continued use surpassed our expectations.

> The attendees' reception of the methodology and expression of strong interest in the methodology and its continued use surpassed our expectations.

Lastly, comparative analyses among FyA schools that have been conducted enabled a comparison of quantitative results and qualitative perceptions. Impressions derived from observation contrasted with results derived from modeling has provided a deeper understanding of school characteristics and reinforced the methodology's potential. We feel that this work not only provides an excellent example of an OR application in a developing country, but also, and perhaps even more importantly, of how OR can help improve the lot of the less fortunate and help alleviate the seemingly increasing gap between the rich and the poor.

Again, the authors are grateful to IFORS for the monetary award, which helped finance further research and the Prize, which encouraged FyA efforts to increase the usage of analytical techniques as managerial tools. 🌐

Suitable even for those who think MCDM is a Roman Numeral

Hans Ittmann <hittmann01@gmail.com>

Multiple Criteria Decision Making – From Early History to the 21st Century
by Murat Köksalan, Jyrki Wallenius and Stanley Zionts. World Scientific, 2011,
World Scientific Publishing, Singapore, pp 197. ISBN-13 978-981-4335-58-4, 72 US dollars.

Multiple Criteria Decision Making (MCDM) is a sub-discipline of Operations Research that is explicitly concerned with structuring and solving decision-making problems involving multiple criteria. MCDM has been an active research area since the 70s and is arguably one of the most important and fastest growing subfields of OR. However, the earliest known reference to MCDM, obviously not named as such then, can be traced back to Benjamin Franklin who used a paper system to help him make decisions around important issues. This rich history dating back to the 1700s has been captured and documented for posterity by three seasoned scholars who have worked in the area for many years: Murat Köksalan, Jyrki Wallenius and Stanley Zionts.

For someone venturing into any field, it is useful to get a summarized view of the breakthroughs that have affected the specific field. *Multiple Criteria Decision Making –*

ming for solving problems with multiple objectives stimulated early work in multiple objective mathematical programming.

The next three chapters are devoted, respectively, to MCDM developments in the 70s, the 80s, and the 90s and beyond. The 70s saw a whole range of methods developed and a number of seminal books published. A number of new areas were explored, including, interactive mathematical programming methods, vector optimization, the concept of achievement scalarizing function and the Analytic Hierarchy Process. At this time, the establishment of the European Working Group on Multiple Criteria Decision Aid (MDCA), the first MCDM conference in 1975, and the formation of the Special Interest Group on Multiple Criteria Decision Making got off the ground.

Chapters 3 and 4 covering the 80s and 90s/beyond devote specific attention to differ-

One gets the impression that one could not ask for more information and description of the various developments taking place in each period discussed than what is presented. Adding interest to the presentation are photographs of individuals, groups, covers of books, and covers of MCDM newsletters.
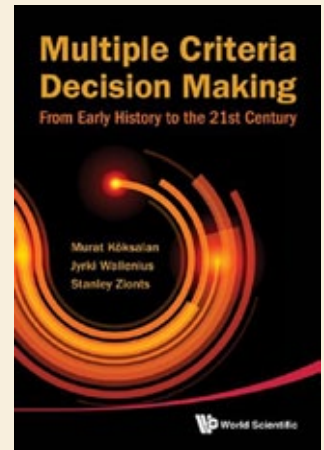
A chapter describes the various MCDM conferences, with a paragraph devoted to each conference from the first one held in France in 1975 till the 20th one held in China. It is very obvious that Stan Zionts played a huge role in the formal establishment of the field, and also the society of which his term of office as the first President stretched from 1979 till 1992! He was also the author of the now famous paper in Interfaces titled "MCDM – If not a Roman numeral, then what?"

A Who's Who of the major MCDM contributors is included in the final chapter. The biographies differ in content, with some elaborate and others very short. One suspects that there are some people missing from this list.

> Köksalan and his co-authors provide us with a better understanding of the history of an important area in OR where many top researchers have contributed especially over the last twenty to thirty years. It is hoped that this will be the start of many similar publications on the history of Operations Research and its subfields.

From Early History to the 21st Century achieves this by providing the ideas that gave impetus to the field, contributions from related fields, and the development of various subfields as well as schools of thought within MCDM. The result is a high level overview of what constitutes MCDM, as we know it today.

The book presents the seemingly unrelated disciplines of the 60s and their relation to MCDM; how Nobel Prize laureates such as Nash, Debreu, Samuelson, Simon and Arrow devoted a lot of effort to the theory of decision making, behavioural aspects, social choice, games and utility theory; and how the unsuitability of mathematical program-

ent approaches that were developed during these periods. Though not in chronological order, research built on different ideas and how new developments stimulated new thinking are presented. This part gives sufficient attention to areas where the methods were applied in practice.

The chapters highlight MCDM maturing in the 80s; how the 90s saw the rapid increase of MCDM publications; and how, aided by the technological developments in computing, MCDM ideas and tools penetrated other disciplines. The latter is cited as having had a major effect on the development and customisation of MCDM models.

The authors indicate that the book of *Gass and Assad, An Annotated Timeline of Operations Research*, published a few years ago was the impetus for this book on the history of MCDM. Köksalan and his co-authors provide us with a better understanding of the history of an important area in OR to which many top researchers have contributed especially over the last twenty to thirty years. It is hoped that this will be the start of many similar publications on the history of Operations Research and its subfields. As one of the first such publications covering a specific subfield, this book has certainly set a very high standard. 🌐

Operational Research Society of India: Going Strong at 55

The Operational Research Society of India (ORSI) was founded in 1957 to provide a forum for the limited number of Operational Research scientists working in the country at that time as well as to provide opportunities for the exchange of knowledge and application of techniques with scientists from other countries. Along this line, ORSI applied for, and was accepted as an IFORS member in 1959. The Society office is located in Kolkata from where the activities of the eleven chapters at different parts of India are coordinated.

Prof. P. C. Mahalanobis, founder of the Indian Statistical Institute and the prime architect of Planning Commission in India, was the founder President of the Society. ORSI seeks to conduct research in, study of, promotion and propagation of knowledge in OR and allied techniques through: exchange of information; establishment and maintenance of professional and academic standards of work known as Operational Research; improvement of methods and techniques of Operational Research; publishing professional journals; and conducting professional examinations.

ORSI maintains a standard of professional ethics and level in deciding upon its membership. There are several categories of members e.g. Institutional, Fellow, Senior, Life, Annual and Student Member. The membership strength is 828, with a majority residing in India and a few stationed abroad. The Society publishes a quarterly journal OPSEARCH, which brings out high quality and state of the art papers in Operational Research. The journal is in its 48th year of uninterrupted publication and enjoys a wide spectrum of readership both in the India and aboard covering academics, professionals as well as industrial/service sector organisations.

In view of the country facilities available at that time for OR education, ORSI initiated in 1973 an examination system in OR, supplemented by an optional coaching programme, now called the Graduate Programme Examination. The examination system is recognised by the Government of India, Ministry of HRD. Candidates successfully completing the Society's examination programme have held and are holding responsible positions in industry and the academe.

The chapters of the Society regularly organize conferences, seminars and workshops in addition to the annual national convention traditionally held in December. ORSI hosted the First International Conference on OR for Development (ICORD) in Ahmedabad in 1992, and the Fifth one held at Jamshedpur in 2009. The Association of Asia Pacific Operations Research Societies (APORS) held its regional meeting in India in 2003 and 2009 at Delhi and Jaipur, respectively. ORSI has also organized an international conference on Transportation in collaboration with IFORS.

In the future, the Society is looking to explore new vistas to bring about meaningful advancement. ORSI sees OR as playing a vital role in improving the standards of livelihood in the developing country that is India. ORSI has wide scope to offer and carry out advisory and consultancy services to help industry, government, educational and institutions optimize their utilization of resources. 🌍

The national OR Society of Spain SEIO
celebrates its 50th anniversary in Madrid

The XXXIII Spanish Conference on Statistics and Operations Research (SEIO2012) and the VII Workshop on Public Statistics were held from 17 to 20 April 2012 in Madrid, Spain. SEIO2012 was organized by the Rey Juan Carlos University and the Spanish Society of Statistics and Operations Research (SEIO), and co-sponsored by the Rey Juan Carlos University and the Spanish Government.

With 400 attendees, the conference included oral presentations featuring full and short papers as well as posters, which were organized in seven simultaneous tracks. Five plenary keynote lecturers: Dominique de Werra (École Polytechnique Fédérale de Lausanne (EPFL)), Eduardo Barredo (Eurostat), Raymond Carrol (Texas A&M University), Marco Antonio López Cerdá (University of Alicante) and Richard Smith (University of North Carolina) shared varied perspectives on OR. IFORS President de Werra took the opportunity to acquaint the participants with IFORS and its activities.

The afternoon of the second day focused on the SEIO 50th anniversary celebration with activities of historical significance. Marco Antonio López Cerdá delivered the first 'Sixto Ríos lecture', established in honor of the SEIO founder. In a gesture that was greatly appreciated, IFORS President Dominique de Werra gave SEIO a certificate recognizing the half a century of SEIO activity as an IFORS member.

The conference also included a social program which provided excellent opportunities to network from the start to the end of the conference: Apart from the welcome cocktail in the afternoon of the first day of the conference, and the conference dinner on April 20, participants were treated to a choice of a guided visit to one of these: the Museo del Prado (one of the most important art galleries in the world); the Thyssen-Bornemisza Museum; and the Museo Reina Sofia.

The XXXIV SEIO Conference will be organized by the University Jaume I (Castellón). 🌍

Antonio Alonso, president of the Scientific Committee and of the Organization Committee, receives the IFORS fanion with the congratulations and the wishes of IFORS from the IFORS President.