



AT THE FOREFRONT OF ANALYTICS IN AFRICA

FORGING NEW LEGACIES WITHIN OUR SOCIETY



ORSSA Newsletter March 2013

www.orssa.org.za





42nd ORSSA Annual Conference

15–18 September 2013

An advance warm welcome to the 42nd Annual Conference of the Operations Research Society of South Africa (ORSSA)! The Conference will be hosted by the Western Cape Chapter of ORSSA, and will be held at the Protea Hotel Stellenbosch in Technopark, just outside of Stellenbosch, from September 15th to 18th, 2013.

The conference will open with a welcome reception on Sunday evening September 15th and will close at lunchtime on Wednesday September 18th. Participation over the full spectrum of Operations Research is encouraged, including papers of a more fundamental nature, those on the application of Operations Research techniques in business and industry, about topical issues in Operations Research, and about the philosophy, teaching and marketing of Operations Research.

Delegates are responsible for their own travel and accommodation arrangements. The Protea Hotel Stellenbosch in Technopark is recommended, as the Society has arranged competitive rates for delegates. Travel directions to and reservation contact details of Protea Hotel Stellenbosch in Technopark may be found by visiting the ORSSA website at the address below.

Conference delegates have the option either to present non-peer reviewed papers at the conference (as we have become accustomed to in the past, and for which only an abstract submission is required), or to submit full papers for peer-review with the intention of having their papers published in conference proceedings, if accepted for publication.



Protea Hotel Stellenbosch in Technopark

Important Dates

18 March	Early bird registration & abstract/paper submission opens
12 April	Abstract submission closes for reviewed papers
19 April	Notification of acceptance of abstracts of reviewed papers and go-ahead to submit full papers for peer-review
31 May	Submission of full papers for inclusion in the conference proceedings closes
5 July	Early bird registration closes
12 July	Abstract submission closes for oral presentation of all papers
22 July	Notification of abstract acceptance for non-reviewed papers
29 July	Notification of acceptance of reviewed papers for proceedings
1 August	Cut-off for qualification of reduced room rates at the hotel
26 August	Registration closes

Please visit the conference website for more information:
<http://conferences.sun.ac.za/index.php/orssa/>

FROM THE EDITOR

By MARK EINHORN (14854937@SUN.AC.ZA)
ORSSA NEWSLETTER EDITOR



Mark Einhorn

Hello all and welcome to the first ORSSA Newsletter of 2013! I hope that you all had a relaxing and enjoyable festive season and that the new year is going well so far! I know, I know, the year isn't exactly new anymore but it was not too long ago, and with it has arrived our new-look Newsletter! I hope you all enjoy it! Right! Now that I have got the pleasantries out of the way let's get into this month's edition!

This is the part of my editorial where I usually give an outline of what is contained in the Newsletter, but before I do so this time around, I unfortunately have to point out what is *not* in the Newsletter. Much like last year, article submissions to the Newsletter have been extremely low; in fact, non-existent. That's right! At the time of writing this I have not received a single article for publication in the Newsletter for this year. This makes it extremely difficult to put together a Newsletter and more-often-than-not leads to significant delays in delivery times. I urge you all as members to inform the Society of your work by writing articles and submitting them to the Newsletter for publication! The Newsletter is an excellent medium to showcase one's work and submissions need not be long or technical.

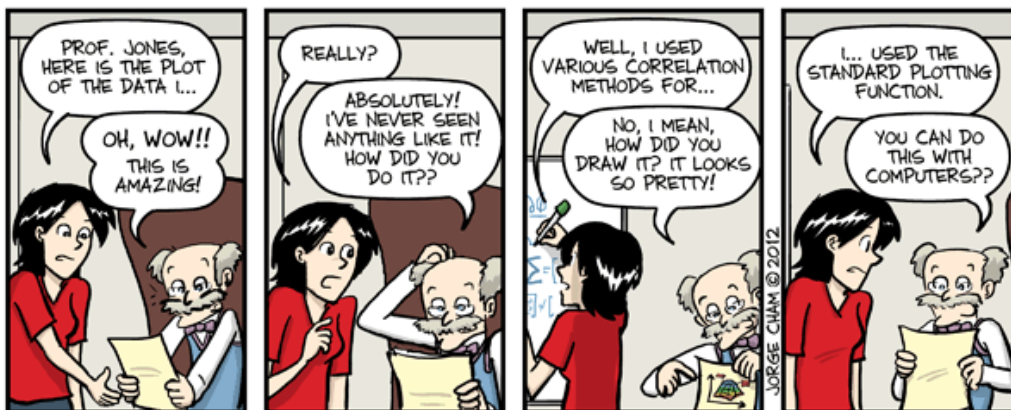
Moving on, what *is* in this edition is a detailed account of the two new medals ORSSA will be introducing at this year's annual conference for the winners of the student competitions, and honouring two icons of Operations Research in South Africa, Gerhard Geldenhuys and Theo Stewart! The issue closes with a thoroughly enjoyable book review by Hans Ittmann on multi-criteria decision making. Well that's all from me for now. Cheers all and enjoy the read!

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QUERIES & CONTRIBUTIONS

Any queries or contributions to the Newsletter are most welcome, especially article submissions. For any queries or contributions, please contact the Newsletter editor.



WWW.PHDCOMICS.COM

FROM THE PRESEIDENT'S DESK

BY JAN VAN VUUREN (VUUREN@SUN.AC.ZA)

ORSSA PRESIDENT



Jan van Vuuren

As you read this, we are already in the third month of 2013! I trust that our members have had a good, restful festive season with family and friends since our last Newsletter edition, and that the year has started well for each and every one of you. May I wish you all the best for the rest of 2013; may it be a good year for you personally and professionally, and may it be another good year for our Society!

There are a number of exciting initiatives that members can look forward to this year. Let me mention a few of them to whet your appetite. We are in the process of testing a new state-of-the-art database which will have a web-based front end. Members of ORSSA will each be able to manage a personal profile from the Society's webpage where they will be able to log in and update their personal details. It should be fully functional during the second half of the year, but more about this initiative later in the year from our webmaster and database manager.

Preparations for our 42nd Annual Conference (during the period 15–18 September 2013 in Stellenbosch) are well under way under the capable leadership of Local Organising Committee Chair *Danie Lötter* (who is also our Newsletter Business Manager). *Theo Stewart* (emeritus professor in the Department of Statistical Sciences at the University of Cape Town) has graciously accepted an invitation to be our keynote speaker at the conference this year.

The peer-reviewed Proceedings of our 41st Annual Conference held at Aloe Ridge last year have been published on our website under the skilled editorship of *Elias Willemse* and his team. All the Department of Education's guidelines with respect to subsidy qualification have been followed to the letter during the review and publication processes. Members should therefore be able to apply successfully for subsidy due as a result of their contributions in these Proceedings.

We are introducing medals for the two categories (honours/4th year projects and masters theses) of our national student competition. These medals will be awarded for the first time at our conference in September, and are named in honour of two stalwarts of our Society who have been involved in the training and mentorship of generations of operations research post-graduate students in South Africa:

- **The Gerhard Geldenhuys Medal** for the best honours or fourth year project, and
- **The Theodor Stewart Medal** for the best masters thesis.

Please see the feature article on page 5 in this edition of the Newsletter detailing the nomination process for naming these medals and for the exciting new initiatives around

managing the student competitions in future.

Our Society now has a presence on various popular social network media. Please follow us on:

- **Facebook** — Please visit (and like!) our page at www.facebook.com/ORSAocietySA.
- **Twitter** — @_ORSSA_.

Let me close by welcoming a number of new members to the Executive Committee of ORSSA. They are:

- *Hennie Kruger*, who is starting his four-year presidency cycle this year. He will be vice president during the peripheral years 2013 and 2016, and president during the period 2014–2015. Welcome Hennie; may your term of spearheading our national operations research family be a richly rewarding and productive time for both you and ORSSA!
- *Jonas Stray*, who is our new treasurer, and has just taken up a position as lecturer within the Department of Statistical Sciences at the University of Cape Town, but has been a member of ORSSA since 2009. Jonas is also the subject of the regular member interview column in this edition of the Newsletter (see page 9). We trust that your big move and the transition from the Swedish winter to the South African summer has gone well, Jonas.
- *Michelle van der Merwe*, who was elected chairperson of the Western Cape Chapter in November last year and is therefore a newly co-opted member of the Executive Committee. Michelle has already started planning activities for the Western Cape Chapter during 2013, including a very successful colloquium early in February.
- *Aderemi Adewumi*, who was elected chairperson of the KwaZulu-Natal Chapter in November last year and is therefore also co-opted to the national Executive Committee. Remi has managed to resurrect interest in chapter activities in the region surrounding Durban. Good luck with your much appreciated initiative, Remi.

There has also been some reshuffling of Executive Committee members in terms of portfolios. *Margarete Bester* stepped down as chairperson of the Western Cape Chapter last year, but has stayed on in the capacity of additional member of the Executive Committee with the responsibility of organizing our two categories of the national student competition. Thank you for your continued support, Margarete. Finally, *Dave Evans* is incumbent in our newly created portfolio of Marketing Manager. Welcome in this important capacity, Dave – we are grateful to retain your support and expertise in the Executive Committee upon the completion of your four-year presidency cycle (2009–2012)! Dave has already started working hard in his new capacity, launching a range of initiatives, including establishing a presence for our Society on various social media and setting goals for ORSSA's marketing initiatives.

I am looking forward to working closely with the Executive Committee, building out and improving the quality of service that ORSSA provides to its members in 2013. Please feel free to contact me at the email address above should you have any suggestions or initiatives that you feel might benefit our Society, if implemented.

Best wishes, until the June edition of the Newsletter.

THE 2013 ORSSA EXECUTIVE COMMITTEE



President:
Jan van Vuuren



Vice-President:
Hennie Kruger



Secretary:
Tanya Visser



Treasurer:
Jonas Stray



Database Manager:
Ian Durbach



**Marketing
Manager:**
Dave Evans



ORiON Editor-in-Chief:
Stephan Visagie



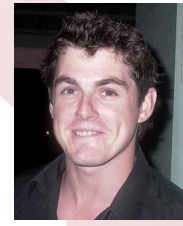
**ORiON Journal
Manager:**
Martin Kidd



**Newsletter
Editor:**
Mark Einhorn



**Newsletter Business
Manager:**
Daniel Lötter



Webmaster:
Niel Mathee

Additional Members



Margarete Bester



Elias Munapo



Elias Willemse

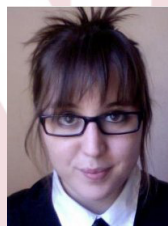
Chapter Chairs



Johannesburg:
Louis Dannhauser



Pretoria:
Winnie Pelser



Vaal Triangle:
Lieschen Venter

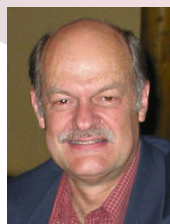


Western Cape:
Michelle van der
Merwe



Kwazulu-Natal:
Aderemi Adewumi

External Liaison Representatives



IFORS Representative:
Hans Ittmann



EURO Representative:
Theo Stewart

CHAPTER NEWS: WESTERN CAPE CHAPTER

By MICHELLE VAN DER MERWE
(MICHELLE@WIGROUP.CO.ZA)

WESTERN CAPE CHAPTER CHAIR

The first Western Cape Chapter event of ORSSA was held on Thursday the 7th of February 2013. Emiritus Professor Paolo Toth (University of Bologna, Italy) presented a talk on the *Train-Unit Assignment Problem* (TUAV). The problem consists of finding the minimum cost assignment of train units to



Professor Paolo Toth

a set of timetabled trips in order to fulfil the number of seats required. Two Integer Linear Programming formulations of the TUAV were presented and extensive computational results on real-world instances were reported. A record number of people attended the event at the Department of Logistics at Stellenbosch University (where Paolo Toth was an Extraordinary Professor of Operations Research during the period 2009–2011) after which refreshments were served and the attendees were afforded a networking opportunity. I would like to thank everyone for attending the event and will keep you all informed about upcoming events!

ORSSA GETS SOCIAL!

Not that the members of ORSSA were never a social bunch before (as is made ever more apparent with every Annual ORSSA Conference), but now the Society has decided to take it's social aspect to the world wide web! That's right! The Operations Research Society of South Africa now has social media presence on Facebook and Twitter! Follow us at www.facebook.com/ORSocietySA on Facebook and @_ORSSA_ on Twitter for all the latest news regarding the Society and its members as well as a great place to share any of your comments or ideas for the Society and Operations Research in general!



Dave Evans is the newly appointed Marketing Manager of ORSSA and any ideas or comments you have to further the Society's presence and importance on social media would be gladly received by him. Dave is contactable at DaveE@dbsa.org. In the mean time, why don't you go and have a look at some of the photos from last year's Annual Conference on ORSSA's Facebook page?

20th CONFERENCE OF THE INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES



I F O R S

The Art of Modeling **BARCELONA 2014**

This triennial conference will be held from 13-18 July 2014 in the city of Barcelona, on the Mediterranean coast of Spain. We are working to prepare an attractive scientific program with a diverse and high quality number of participants sharing their knowledge and experience of operational research.

The venue is Barcelona International Convention Centre, which was built for Barcelona's International Cultural Forum in 2002 and is one of the facilities to host major conferences. Barcelona is a dynamic, open, and inviting city, which displays the characteristics of major Mediterranean cities and inherits a rich tradition in science, art and commerce.

We invite you to learn, enjoy, and be part of the great IFORS community by participating in IFORS 2014. Organize a session, give a talk and experience this great city! More details are available at www.ifors2014.org.

FORGING NEW LEGACIES WITHIN OUR SOCIETY

By Mark Einhorn (14854937@sun.ac.za)

Exciting times are afoot for the Operations Research Society of South Africa! In June 2012 the Executive Committee (EC) approved an initiative by Jan van Vuuren to introduce two new medals as of 2013 for the winners of the two categories of the ORSSA national student competitions. Following nominations for the names of the two medals, the EC voted on what they believed to be the most fitting names for the two new medals. As a result this year's ORSSA Annual Conference will see two new medals join the ranks of the Tom Rozwadowski medal. These are *The Gerhard Geldenhuys Medal for the best honours or fourth year project*, and *The Theodor Stewart Medal for the best masters thesis*. Mark Einhorn now takes you through how the medals came to be, the student competitions for which the medals are awarded, the nomination process of naming the medals, motivations for the choice of medal names, and finally a word from the two honorary ORSSA members after which the medals have been named.

ing the Society's Tom Rozwadowski medal, and while the two new medal introductions are for entirely different levels of achievement than that associated with the the TR medal, which remains the Society's premier annual award, it is hoped that the new medals will represent something that both students and their supervisors will aspire towards winning each year at the Society's Annual Conference.

The competition structure

The two competition categories will be managed in much the same way as in the past according to the rules which are outlined on the Society's website (www.orssa.org.za), with the main differences being that the medals are now the chief competition prize (which may be supplemented with cash prizes from time to time if companies or individuals willing to sponsor the competitions can be found) as well as the additional requirements that, based on the submission of their written work, two finalists per category (or their representatives) should present their work at the annual conference (again, if appropriate sponsorship



An idea of what the *Gerhard Geldenhuys Medal* and *Theodore Stewart Medal* may resemble

How the medals came to be

In the past, whenever prizes have been awarded by ORSSA for the national student competitions, the prizes were tangible, but not necessarily memorable: perhaps a cash prize or a bottle of wine which, after a matter of time (considerably less in the case of thirsty students being awarded wine), left the students with nothing to show for their achievements. It was decided that medals would be introduced to raise the level of awareness as well as the prestige associated with winning the two student competition categories. This decision was inspired by the legacy surround-

can be found). The winner in each category is to be announced (and the medals are to be awarded) at the annual conference. Only individual work will be considered, and at most one medal will be awarded annually for each competition category. As with the Tom Rozwadowski medal, a hall of fame will be established for each of the new medals, enabling them to grow in stature and prestige over the coming years. Both Gerhard Geldenhuys and Theo Stewart have accepted an invitation to present the first round of the medals bearing their names to the two winning students at the 42nd Annual Conference to be held in Stellenbosch during 15–18 September this year.

COMPUTER SIMULATION

Simulation Engineering Technologies (SET) is an independent consulting company and a leader specialising in creating accurate discrete-event computer simulation models of complex systems in mining, logistics, manufacturing and service industries.



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in conducting simulation studies to provide maximum value to clients.

Using simulation technology has many advantages and has become mandatory for leading companies when performing due diligence studies of a new mine, process design or prior to changing current design parameters. The following are only a few of the advantages of using computer simulation:

“Using simulation technology has many advantages and has become mandatory”

- Reduces risk
- Provides an insurance policy
- Enables managers to make better decisions
- Capital avoidance
- Captures randomness and variance
- Improves profits

Computer Simulation Solutions Mining

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- Truck Queuing Models
- Crushing and Conveying

Surface

- Stockpiling and Blending
- Processing Plants and Smelters



Manufacturing / Assembly Lines Logistics

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- Rail Fleet Requirements
- Loading/Offloading
Rate Requirements
- Rail Network Design

Ports

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Rate Requirements
- Berth Utilisation and
Vessel Demurrage
- Capacity Planning

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**SIMULATION ENGINEERING
TECHNOLOGIES**

The nomination process

Once it had been decided by the EC that the medals were to be introduced, a sub-committee was formed in March 2012 consisting of Jan van Vuuren (ORSSA President), Dave Evans (ORSSA vice-president at the time), Marthi Harmse (ORSSA treasurer at the time) and Margarete Bester (ORSSA National Student Competition Coordinator). This sub-committee was tasked with the naming process associated with the medals, investigating the costs associated with the introduction of the medals, as well considering a possible restructuring of the student competition rules. To begin the naming process, a call for nominations of appropriate medal names was first issued in the October 2012 issue of the Newsletter and again in the December issue. Members of ORSSA were asked to provide brief motivations as to why they had put forward their nominations. Once the closing date of 31st January 2013 for the submission of nominations had passed, the nominations received were presented to the EC who then had the unenviable task of deciding what the final medal names would be by means of a majority vote.

Our two esteemed members after whom the medals are named

Entries for the naming process included past ORSSA members who were instrumental in shaping the foundations of Operations Research in South Africa and ORSSA itself. The two winning nominations were selected on the basis of their namesakes' contributions to the development and teaching of Operations Research at post-graduate level, having supervised more than 30 masters students and 12 PhD students to completion between the two of them as well as numerous fourth year/honours students. This is in addition to both being Honorary Life Members of ORSSA (over the nearly 50-year history of ORSSA only seven individuals have been granted honorary life membership of ORSSA).

I could go on for quite some time if I were to highlight each and every achievement of both these giants' academic careers, but due to space constraints I will highlight only their involvements with ORSSA and their contributions to the teaching of Operations Research in South Africa, starting with Professor Gerhard Geldenhuys. Gerhard Geldenhuys was present at the founding of ORSSA in 1969, together with other South African OR icons such as Professor HS Sichel, Dr Gerhard Rudolph, Dr Jos Grobelaar, Mr Dave Masterson, Mr Hendrik du Plessis and others. He served on the national EC of ORSSA during the period 1974—1975 and again from 1994 to 1997. He and his students regularly attended the annual conferences of ORSSA, where their contributions covered topics including the teaching of OR, war gaming, allocation of library funds, various applications of scheduling, and graph colouring. In 1999 ORSSA recip-

rocated by conferring on him honorary life membership.

Gerhard Geldenhuys always considered teaching his primary responsibility, but was of the opinion that neither teaching nor research could be carried out in isolation: his teaching was invigorated and refreshed by his research while he ensured that his research was a collaborative activity, using it as a teaching medium, often involving students as well as colleagues. Gerhard was amongst the first university lecturers in South Africa to introduce graduate and undergraduate courses on OR topics (he introduced OR at undergraduate level at Stellenbosch University in 1961 in the form of a series of lectures for third year students in Applied Mathematics). As a teach-



A fascinating lunch meeting.

From left to right: Theo Stewart, Danie Lötter, Mark Einhorn and Gerhard Geldenhuys.

er Gerhard took a close and sympathetic interest in all of his students and, as a result, a notable number of the 22 masters students and two PhD students whom he supervised to completion went on to play central rolls in ORSSA and in practising OR in South Africa and abroad.

Theodor John Stewart initially became involved with OR while still a student at the University of Cape Town. Theo has served the ORSSA community in a variety of ways, including ORSSA president in 1978, while from 1984 to 1989 he was the founding editor of ORiON. Since then he has regularly served on the national EC in a variety of capacities, amongst them as chair of the Western Cape and Pretoria chapters of ORSSA, and recently as EURO representative.

In terms of teaching and research, Theo Stewart has co-authored three books and published more than 80 refereed papers or reports. He and his students are regular contributors to ORSSA and other conferences and have read more than 90 conference papers in total, primarily in the broad area of multi-criteria decision analysis. He has supervised nine PhD students to completion and has

been evaluated as an A-rated researcher by the National Research Foundation of South Africa. The quality of his contributions has been acknowledged by ORSSA who awarded him honorary life membership in 2012 and the Tom Rozwadowski Medal on a record five occasions!

It seems only fitting now that these two gentlemen be honoured by becoming forever synonymous with excellence in the training of post-graduate OR students in South Africa.

A word from the gentlemen themselves

Danie Lötter (ORSSA Newsletter business manager) and I were recently lucky enough to have lunch with both Gerhard Geldenhuys and Theo Stewart at the University of Cape Town. It was a fascinating meeting and conversation topics varied from OR stories of old and past colleagues to both men's present day interests and activities.

When asked whether they had a word or two regarding their newly conferred honour for the members of ORSSA reading this article, both were unsurprisingly humble in their response. Gerhard Geldenhuys felt "honoured" to be named alongside someone "who has had such a profound impact on Operations Research in South Africa" but believes that his being honoured is "almost an accident of history" and comes as a result of him "being in the right place at the right time for certain things." I think I will have to politely disagree with Professor Geldenhuys on this point as I believe that the time and place that his work took place in cannot detract from its quality and impact. Theo Stewart reiterated Gerhard's sentiments, adding that "it's an honour just to be nominated," before quipping "You know you're getting old when they start naming things after you!"

MEMBER INTERVIEW: JONAS STRAY



Jonas Stray

Jonas Stray obtained his BSc in Chemical Engineering in 1998 at the University of Borås in Sweden. He obtained his MSE in Industrial Engineering at Arizona State University in 2000 and, following a few years during which he worked in both industry and academia, he obtained his PhD in Operations Research at Stellenbosch University in 2010. His interests include the application of OR techniques, in

particular with regards to achieving industry approval for implementation of said techniques. His PhD topic covered decision support in the sugar industry, using optimisation methods to model and schedule the harvesting operations.

Firstly, let me say welcome (back) to South Africa, and in particular the Cape. How are you settling into your new life here?

Thank's for the welcome, Mark. The best way to describe how I'm settling in in SA this time around is that I am trying to focus hard on making things good for my wife and son. We are renting a nice little house and have managed to buy a car to take me to and from work and we are looking to buy a run-around for my wife so that she can start living when I'm not at home. Other than that we have already enjoyed the company of our friends from my PhD days and have been to quite a few nice places like Haute Cabriere, Longtable and the cafes on Church street in Stellies.

Nominations for ORSSA Awards

Nominations are now open for the 2013 round of ORSSA Fellowship and Recognition Awards. Individuals considered for the high distinction of fellowship should typically have served the Society in an exemplary manner for a considerable period of time, or should have served the science and profession of Operations Research over a considerable period of time. Recognition Awards may be made in one of the following three categories:

- Category I: To a retired member of ORSSA for outstanding contributions, typically over long period of time.
- Category II: To a current member of ORSSA for a single, outstanding achievement with respect to the practicing of OR on a national level.
- Category III: To a non-member of ORSSA for outstanding contributions, typically over a long period of time.

Any member of the Exec (or of the Society, for that matter) may nominate a Full Member of ORSSA for consideration of any one of these four distinctions, by submitting the following documentation to Jan van Vuuren at vuuren@sun.ac.za:

- Full names and contact details of the nominator,
- Full names and contact details of a seconder,
- Full names and contact details of the nominee,
- A detailed motivation for the nomination.

The closing date for nominations is May 30th

When and how did you first become involved with OR and in particular ORSSA?

As I mentioned I did my PhD in South Africa as a student of Prof van Vuuren, and that's when I got involved with ORSSA. This took place during 2008 to 2010. I first became involved in the OR area in 1998 to 2000 as I obtained my masters in industrial engineering at Arizona State University in Tempe, USA.

You recently took up a position at the University of Cape Town within the Department of Statistical Sciences. What do some of the responsibilities of this position include?

I'll be teaching in Theo Stewart's honours level course in operations research, Melvin Varuguese's masters level simulation and optimisation course and in the introductory statistics course in the department together with another new lecturer at UCT, Shebnem Er of Turkey. That course is currently led by Dr Leanne Scott. As far as research is going, it will remain top secret for a long time; - no, just kidding! I will focus on methodological development, in particular combining stochastic simulation, optimisation and multi-criteria decision analysis in collaboration with a number of esteemed academics, primarily in the Western Cape.

You were recently elected onto the Executive Committee of ORSSA in the capacity of Treasurer, what direction would you like to see ORSSA move in as a member of its EC?

My first part to play is probably to help in streamlining some of the activities regularly occurring within the organisation. We have a responsibility first and foremost to our members, and we must look after that responsibility with vigilance, lest the society should become complacent. There is so much good OR can accomplish out there in industry, government and general society and ORSSA must set a good example for others to follow.

Have you been involved in any interesting OR related projects of late, and if so, could you provide us with some brief details?

The last OR project I was involved with was completed in 2010, so I'd rather save this question for one or two years from now, as I am attempting to initiate new as they say.

Having lectured in both Sweden and South Africa, is there anything that the South African OR curricula could learn from their Swedish counterparts and vice versa?

I must say that I think that South African OR is very much alive and highly applied already. The OR of a particular area must be shaped by the applications abundant in

that area. Thinking back of my Arizona days, the area was littered with semiconductor manufacturing plants. Intel, Motorola and ST Microelectronics all had chip production within 50 kilometres from the University, so the operations research techniques that I came across were a lot about scheduling and production systems design optimisation. Here in the Cape Town area, we should be proud of the applications we have already investigated, such as water management, electrical grid planning, food distribution, etc. We also have a nice traffic problem to tangle with, ha ha!

What, in your opinion, is the potential for the application of OR in the South African market place and government sector?

I think that OR doesn't just help in solving mathematically complex problems or in stochastic and rapidly changing problems, but also causes improvement by its very attempted application. What I mean is that by just trying to formulate, for example, a government agency operation as an OR problem will force the agency to think about its organisation and may discover many improvement points to work on in the process. Remember that organisations do not have to be large to apply OR techniques. A small office such as the Traffic department could benefit from being modelled by OR people from time to time.

What are some of the fonder memories in your OR career thus far?

It's when I realised that the single-grower seasonal harvest scheduling problem should not be modelled as a generalised assignment problem, but rather as a time dependent travelling salesman problem. It just came to me and it felt very good!

Finally, do you have any parting advice for young OR academics and practitioners?

Do a thorough, high quality job in whatever you do. It's the only way to grow your career organically, that is, without deceiving the rest of us. Besides, it's a good way to get pleasure out of your work. Draw a line between work and private life each day, and trust that it is better to give than to receive.

DISCLAIMER

The views expressed in this Newsletter are those of the contributors and not necessarily of The Operations Research Society of South Africa. The Society takes no responsibility for the accuracy of the details concerning conferences, advertisements, *etc.*, appearing in this Newsletter. Members should verify these aspects themselves if they wish to respond to them.

MULTIPLE CRITERIA DECISION MAKING – FROM EARLY HISTORY TO THE 21ST CENTURY

By Hans Ittman (hittmann01@gmail.com)

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 – 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 programming 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 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 (MCDA), the first MCDM conference in 1975, and the formation of the Special Interest Group on MCDM got off the ground.

Chapters 3 and 4, covering the 80s and 90s and beyond, devote specific attention to different 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.

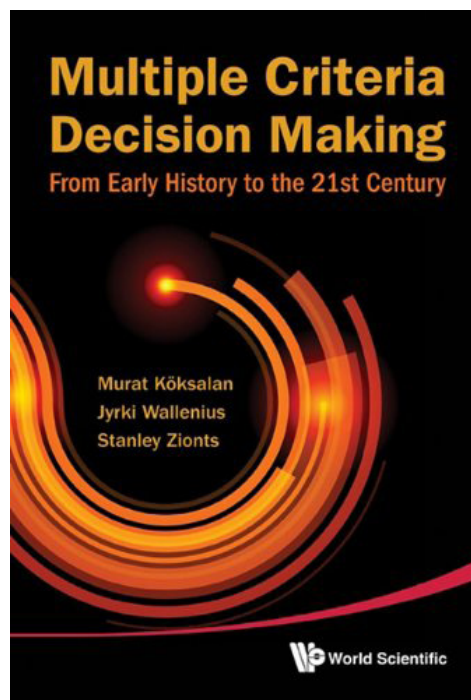
The chapters highlight MCDM maturing in the 80s; how the 90s saw the rapid increase of MCDM publications; and how, aided by the technological developments in computing, MCDM ideas and tools penetrated other disciplines. The latter is cited as having had a major effect on the development and customisation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

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 up to the 20th one held in China. It is very obvious that Stan Zionts played an important 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 until 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 some people are missing from this list. Of interest to ORSSA members is the prominent role Theo Stewart has played, and is still playing, in the MCDM environment. He features as one of the major contributors



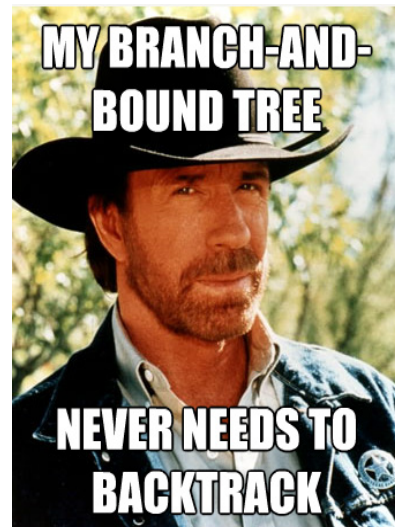
to the field in the book. Facts about and achievements of Theo that are possibly not that well known, which are mentioned, include his active involvement for many years in the EURO MCDM working group as well as the International Society on Multiple Criteria Decision Making. In the latter case he was the President of the MCDM society during the period 2004-2008 and also received the society's gold medal in 2008. Theo is also the current managing editor of the journal *Multi-Criteria Decision Making*, while his book *Multiple Criteria Decision Making: An Integrated Approach* co-authored with Valerie Belton has over 1000 citations! A further interesting fact is the following extracted from Theo's ORSSA Presidential Address in 1978: "In 1977/78 president of TIMS, Gerald M Hoffman identifies two areas of great potential benefit to the practice of OR (OR/MS Today, November 1977). The first I am glad to say is one to which we at NRIMS (National Research Institute for Mathematical Sciences, CSIR) have started to give attention, namely multi-attribute decision theory. Already here we are beginning to go beyond mathematics, and are keenly aware of the need, as Hoffman has pointed out, to see behavioral scientists contributing to the illumination of the behavioral assumptions which underlie the common multi-attribute decision models." That was at the start of his MCDM research career!

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.

Book info: 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.

ON THE LIGHTOR SIDE...



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Invitation and Call for Papers

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IFORS is pleased to announce that the above Prize will be awarded during the 20thth Triennial conference on “The Art of Modeling” to be held in Barcelona, Spain from 13-18 July 2014.

- **Awarded at the close of the IFORS Triennial Conference and carries with it a grand prize of US\$ 4,000.00 and a runner-up prize of US\$ 2,000.00**
- **The finalist papers are automatically considered for publication in the IFORS Publication, International Transactions in Operational Research (ITOR). Publication is contingent upon the usual refereeing process. Authors of these papers agree that the first right to publish their papers lies with ITOR; as such, they will not publish the same until and unless they receive permission to do so by the ITOR editor.**

Important details about the competition follow:

Topic of paper

- The paper describes a practical OR application in a developing country, conducted to assist a specific organization in its decision-making process with regard to education, health, and other basic services, water, technology, resource use (physical or financial), infrastructure, agricultural/industrialization, environmental sustainability with original features in methodology or implementation for development in developing countries. The idea is to optimize the development with the constraints and limited resources.
- The paper includes some description of the application’s social context and its impact on the decision making process or on the organization for which it was conducted. Where appropriate, the relevance of the country’s state of development to the study is addressed. A stress on developmental issues will be an important factor in the judging. Papers of a purely technical nature, or those, which have no relevance in the developmental context, will not be considered.

Judging Criteria

- Qualifying papers will be evaluated on the following criteria: problem definition, creativity and appropriateness of approach, MS/OR content, stress on developmental issues, innovative methodology, impact of the study, paper organization and structure, participation of local researchers and quality of written and (if selected as finalist) oral presentation.

Other Information

- Principal authors and presenters of any nationality are welcome. If selected to be among the finalists, the entry must be presented by one of the principal authors during the IFORS Triennial Conference to be held in Barcelona, Spain from 13-18 July 2014.
- Finalists’ registration fees will be sponsored by IFORS. For finalists who are nationals of developing countries, a grant for living expenses may be requested but cannot be guaranteed.
- All contributions must be submitted using the submission site <http://mc.manuscriptcentral.com/itor>, indicating in their cover letters that they are intended for this competition.
- Other inquiries should be sent directly to the Prize Chair: Prof. Andres Weintraub at aweintra@dii.uchile.cl.



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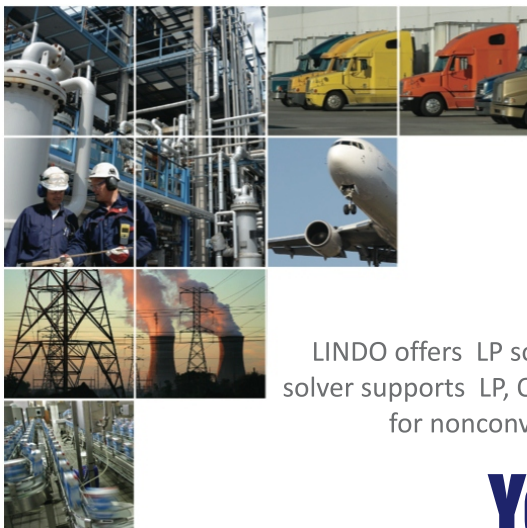
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