

NEWSLETTER

Executive Committee: HW Ittmann, P du T Fourie, FE van Dyk, T Stylianides, SG Berjak, LP Fatti, WR Gevers, KJ Koch, JH van Vuuren, SE Visagie, DW Evans, M Turpin, TJ Stewart, A-M Pothas, D Petkov

FROM THE PRESIDENT'S DESK

By Hans Ittmann
ORSSA President
hittmann@csir.co.za



Hans Ittmann

As I write this piece, less than a month has elapsed since the tragic events of 11 September 2001. There is, on the one hand, an expectation worldwide of retaliation and, on the other hand, a real concern that things may escalate to levels that no one really wants to contemplate. What is, however, true is that those actions will forever stand out in world history while they have also changed this world of ours significantly. Having just been in the States for a week, there were two things

that made a huge impression on me. Firstly, the way a nation can unite to address adversity and, secondly, even in these terrible times, life has to carry on. As we witness world events unfolding around us, we as Operations Researchers need to commit and dedicate ourselves yet again to address the challenges facing us, especially here in our wonderful country. During this time I have seen a number of quotes and one or two made a lasting impression on me. The first one is from Eleanor Roosevelt: *"You gain strength, courage and confidence by every experience by which you really stop to look fear in the face. You are able to say to yourself, I lived through this horror, I can take the next thing that comes along"*, and the other from Martin Luther King, Jr. *"We must accept finite disappointment, but we must never lose infinite hope"*.

The annual conference of our society was held on 17 September 2001 at the Vaal Triangle Campus of the Potchefstroom University of Christian Higher Education. This was a very successful event and our appreciation for this goes to the organisers, Marthi Harmse, Dries de Wet, Anne-Marie Pothas and their assistants. As this was a one-day event, four parallel sessions had to be scheduled over and above the plenary session. There

were many interesting papers which signifies that there is a lot being done out there! This to me is very encouraging because it indicates that OR is alive and doing very well. During the opening session of the conference the society acknowledged excellent work by its members. The prestigious Tom Rozwadowski medal was presented to John Hearne (for 2000) and to Jan van Vuuren and Grant Huddleston (for 2001). The winner and runner-up of the student competition were also announced. Congratulations to all of these worthy recipients! What was also very encouraging at the conference was to observe the many young and new faces, plus some old timers whom we have not seen that regularly!

At the annual general meeting of ORSSA, held during the conference, a new executive was elected. With the two-year term of office of the President, Philip Fourie, expiring and with our Vice-President, and President elect, Rob van den Honert deciding

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KwaZulu-Natal: D Petkov (petkov@comp.unp.ac.za)

November 2001

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to move to Australia, a new President had to be elected. This honour came my way and, although this would be my second term of office, it is still a privilege to serve our society. On behalf of all our members I would like to thank Philip Fourie and the outgoing executive for what they have done over the past two years.

We also bid farewell to the editors of our newsletter over the last few years, Kathryn Koch (who should be a first time mother by now - congratulations Kathryn!) and Heather Tarr. They did a marvellous job in keeping our members informed of what was happening in and around our Society. To both of you for all your hard work, a big thank you! With change comes renewal and what you now have in your hand is the first edition of a new look newsletter. Stephen Berjak is the one responsible for this and I urge you all to give him your full support. I am convinced our newsletter will go from strength to strength!

In taking on this position I am really excited about what I see happening around us with our discipline. Operations Research is happening all over, many people are actually doing OR and more and more problems are being addressed using OR in some kind of way. Some of you may think quietly by yourself, but this guy must be living on a different planet because we don't see any of this! Let me quote a paragraph verbatim from an article from the OR Newsletter of the UK Society, it is from the October 2001 issue and it illustrates my point: "Earlier this year I interviewed a senior executive of one of the leading UK retailers. One of the questions I asked was: "How much has your OR team contributed to the current re-organisation and optimisation of your business?" I was met with the reply: "We don't do OR!" So I asked if the company actually did Customer Relationship Management, Supply Chain Management, Data Mining etc., I was greeted with the reply: "Yes, we do a lot!" We experience exactly the same in South Africa and quite clearly I'm not from a different planet, but I do realise we, as a society, have a problem. The problem is the age old one namely our name which is nothing else than brand and branding! The challenge remains how do we overcome this or, maybe better, accept this but how do we then capitalise on this!

We have other problems as well. Many of those practising OR are not members of our society. On top of this our current members are not active. For example, only 60 odd members have paid their membership dues for the last year. We sit with a dichotomy – OR being used in many spheres of our society but a society that struggles to mobilise its members. One can argue that we as Operations Researchers have done a great job – OR is pervasive in so many activities in life, surely we have achieved huge success! This is true, but I believe we should also have a vibrant and active society! This I believe is one of the challenges of the new executive.

Another challenge this society faces is around taking OR into Africa. During the ICORD conference, which was held in May earlier this year, a number of action plans were decided on. It is now time to start doing something around these. The executive is committed and keen to get some initiatives going in this regard. Anyone who is interested in being involved, and who wants to contribute, is more than welcome to contact one of the members of the executive.

This newsletter is the last one before the start of the festive season. May I therefore take this opportunity to wish you all a

wonderful festive season and a happy new 2002! ■

EDITOR'S NOTE

Well I must admit to being quite relieved that the first edition of my editorship is complete. If I was a test cricket batsman, I hope this document would equate nearer to (at least) a half century than to a duck!

To begin my innings, I would like to express my appreciation to a few individuals who assisted in the compilation of this newsletter. Firstly, I would like to thank Jan van Vuuren for his continued support throughout. To all the contributors - this document would certainly not be possible without your articles. Lastly, I would like to use this opportunity to invite all OR practitioners to submit interesting snippets of information and/or articles to me at:

sberjak@dip.sun.ac.za

My vision for the newsletter is that it should, first and foremost, be informative to the members of this society, keeping you, the reader, up to speed on local and international OR news. It is equally important for the society to utilise this medium as a marketing tool - to attract new members and financial sponsors.

Besides a 'new look', this edition of the newsletter marks the start of a couple of new, regular features. I plan to conduct interviews with OR practitioners who have made a marked contribution to this society. In this edition, we find out more about Philip Fourie, past president of ORSSA. We keep the reader abreast of the latest publications in both international and local OR journals, by listing details of the authors and the titles of their papers for journals such as JOR, EJOR, ITOR and OriON.

In keeping with tradition, we publish a selected article from OR/MS Today. This edition also covers a special feature, by Isaac Mbeche, on of the state of OR in Kenya. And, of course, there are many other interesting articles too. So until the next newsletter.

Pleasant reading

Stephen ■

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DISCLAIMER

The views expressed in this newsletter are those of the contributors, and not necessarily those of the Operations Research Society of South Africa. The Society is not responsible for the accuracy of details concerning conferences, advertisements, etc., appearing in this newsletter. Members should verify those aspects themselves if they intend to respond to them.

TOM ROZWADOWSKI MEDAL 2000

By Hans Ittmann
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Compelling Reasons for Game Ranching in Maputaland

John Hearne & Margaret McKenzie, University of Natal



John Hearne

This work is contained in a chapter of a book that was recently published. It addresses a problem in wildlife management and more specifically game ranching. More and more land is devoted to wildlife in South Africa. The compelling reason for this is, according to Hearne and McKenzie, economic rather than for conservation reasons. They indicate that with a strong local and overseas market, within the right political and legal framework, game ranching can be made an attractive proposition for farmers in South Africa.

The initial capital outlay is large. Four case studies are presented in this chapter to show how the problem was overcome. Shareblock schemes is one method for raising the required capital – it is described in this chapter and it has had a major impact on game ranching in South Africa. Mathematical models have been developed to optimise the capital usage during the set up phase and for determining management strategies to maximise sustainable income. A case study is presented where an optimal mix of species was determined while another model generated the sequence of purchasing and acquisitions of game to minimise total cost.

John Hearne has shown how mathematical modelling can be used very successfully in game ranching and for this the TR medal is awarded to him. ■

OPERATIONS RESEARCH SOCIETY OF S.A.

BALANCE SHEET AS AT 31 July 2001

ASSETS

INVESTMENTS

NEDBANK – Notice Deposit	51305.66	52671.96
ABSA – Deposit	1366.30	

CURRENT ASSETS

Bank	9470.62	9470.62
		<u>62142.58</u>

FUNDS AND COMMITMENTS

ACCUMULATED FUNDS

Balance on 1 July 2001	61885.14	61642.58
Net loss for the month	-242.56	
Balance on 31 July 2001	61642.58	

CURRENT LIABILITIES

Provision for accounting fee	500.00	500.00
		<u>62142.58</u>

Membership Database

We are busy updating our membership database. Here is a list of all the membership dues received by the treasurer for the year 2001. These listings appear exactly as they were received electronically. Please inform the treasurer, Theo Stylianides (tstylian@csir.co.za), of your personal particulars in the case of institutional listings so that we may identify unknown payments:

Name	Month
Anonymous	Jan-01
Anglo Fox Street	Jul-01
Cruywagen	May-01
D Saunderson	Apr-01
Dep WNNR	Jul-01
Deposito	Jun-01
DJ Hargreaves	May-01
DW Evans	Apr-01
DW Evans	Aug-01
FE van Dyk	May-01
Frank Beichelt	Apr-01
G Kletz	Apr-01
H Ittman	Apr-01
Harmse	Mar-01
Harmse	Apr-01
IA Krige	Jun-01
Univ van	Apr-01
J Corrie	May-01
JAL Napier	Apr-01
JD Roode	Apr-01
JF Dean	Mar-01
JF Degu	Jun-01
JH Swart	Mar-01
JJ Steward	May-01
JM Louw	Apr-01
Joe Kainja	May-01
Kevin Reich	May-01
LAK Bloy	Apr-01
LD Scott	Jun-01
LE Posniak	May-01
LF Scheepers	Apr-01
LP Fatti	Apr-01
Merolog CC	May-01
MJ Venter	May-01
Neil Jacobs	Jul-01
P du T Fourie	Apr-01
Paul Hough	May-01
PICS	Mar-01
PJ de Jongh	Apr-01
PS Kruger	Jun-01
R Koen	May-01
RL Gibson	Apr-01
S Price	Jun-01
Savannah	Jun-01
SCMB/CREDITORSDEPT	Jul-01
SG Sharpe	Mar-01
T Stylianides	Jun-01
UNISA	May-01
Unisa	Jun-01
Univ van Kaap	May-01
Univ van Natal	Apr-01
Univ van Stel	Apr-01
WNNR	Jun-01
WR Gevers	Mar-01

TOM ROZWADOWSKI MEDAL 2001

By Paul Fatti
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Seeking Optimality in Fruit Pulping Schedules: A Case Study

Jan van Vuuren & Grant Huddleston, University of Stellenbosch



Jan van Vuuren

The Tom Rozwadowski medal for 2001 was won by Grant Huddleston and Jan van Vuuren of the University of Stellenbosch for their article: "Seeking optimality in fruit pulping schedules: a case study" which appeared in ORiON Volume 13 (1999) pp 25-51. (This volume was published during the period July 2000 to June 2001, making the articles appearing in it eligible for the 2001 award.) Grant and Jan looked at the problem facing the producers of fruit juices,

of balancing the sometimes conflicting requirements of the market, the supply of fruit for pulping and losses due to spoilage. Scheduling of the pulping process depends on the capacity of the workforce, pulping machine limitations and delivery deadlines. An important consideration for the plant manager is the order in which the various fruit batches are to be pulped, in order to minimise losses due to fruit deterioration while still satisfying customer demand. Grant and Jan modelled this problem as a Linear Program, with the objective function structured as a cascading set of monetary losses suffered by the plant as a result of fruit spoilage. Applying their model to data obtained from the industry showed that substantial financial gains may be accomplished by minimising financial losses, rather than fruit losses, as is currently the standard practice at most fruit processing plants. This paper falls squarely into the category which was envisaged when the Tom Rozwadowski medal was first instituted almost 30 years ago; an interesting formulation to a practical real-life problem. Grant and Jan are to be congratulated on a well deserved recognition for an excellent piece of work. ■

What they're saying about operations research

- INFORMS News

"Domestic airline schedules would not be significantly disrupted if flights were not allowed to depart when a passenger checks baggage but fails to board the plane, a study says. "The security measure that matches passengers to their bags, already used for international flights, would delay one of seven domestic flights for an average of seven minutes, according to Massachusetts Institute of Technology professor Arnold Barnett, the chief author of the study.

" 'Our findings challenge the widely held industry view that (bag matching) would have grave impacts on domestic operations,' the study says. It appears in the March-April edition of the academic journal Operations Research."

— USAToday, May 9, 2001

COMMUNITY WEBPAGE FOR AFRICAN OR PRACTITIONERS

By Leanne Scott
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A community web page is a site where persons with similar interests can "meet" to share information and make new contacts. At the recent International Conference on OR in Development (ICORD) held in May 2001 in the Kruger Park it was decided to explore ways of promoting communication and collaboration between the various people involved in the field of OR throughout Africa. I offered to set up a community web page using the MSN communities site. So far it doesn't look very stunning (I'm waiting for input from you!) and only has 7 "members" but I think it is a potentially good and cheap way of fostering joint work between those of us who, though miles apart, are possibly working under very similar conditions and tackling problems with similar themes, many of them development related.

Anyone can access the site but to interact with it (respond to messages on the message board or post your work for others to see) you need to apply for membership. To do this requires an MSN passport which seems to have flummoxed some, but essentially if you have a Hotmail address you have an MSN passport, so just use this! You then apply for membership using your hotmail address and I will get a message that you want to be a member and duly appoint you as such! (This is only to attempt to keep the site free from unwelcome junk and there is no screening of members as such!)

Please try it out and leave a message, a report of some work in progress or some nice photos of where you live or work as evidence! Or please mail me and tell me of the problem that is keeping people from joining!

<http://communities.msn.com/AfricanORpractitioners>

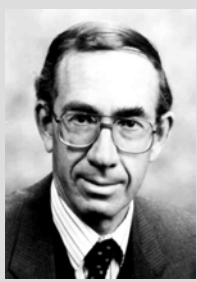
"In the future, operations research will substantially improve performance for Internet-enabled supply chains, according to a study published in a journal of the Institute for Operations Research and the Management Sciences (INFORMS). 'The Internet provides inexpensive communication and data access while operations research supports strategic, tactical, and operational decision-making using this data,' explains Dr. ManMohan S. Sodhi. ...

" 'Companies will improve their supply chain performance by using operations research and the Internet: 1. to improve execution across companies, 2. to improve planning within and across companies, and 3. to improve other functions within the company, such as product development, marketing, sales, and customer service.'

— DSSstar, April 17, 2001

MEMBER PROFILE: PHILIP FOURIE

By Stephen Berjak
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Philip Fourie

Philip Fourie obtained his BSc degree at Stellenbosch University in 1960. At the time, nuclear physics was at the forefront of scientific research, and he obtained a bursary from the then Atomic Energy Board for further study. He received the MSc degree in theoretical nuclear physics in 1962, and then joined the Theoretical Physics group at Pelindaba, where he worked on nuclear structure physics and also on nuclear

reactor physics. In 1972 he received the PhD degree from RAU. By then he had decided that it was time for a change. When a post in the Department of Applied Mathematics at Stellenbosch University was advertised, he applied and was appointed. When he retires in March next year, he will have been there for thirty years.

(Some other people who also started their careers at the AEB and later became interested in OR are Dewald Roode, Johan Buys, John Hearne and Gordon Erens.)

1. When and how did you first become involved with operations research and ORSSA?

During the early 1970's I became interested in Forrester's "World Dynamics", the Club of Rome, and other activities associated with the slogan "The Limits to Growth". Whether this is OR is debatable, but it had to do with applying scientific knowledge and specifically mathematical modelling to the problems of human society. At Stellenbosch, Gerhard Geldenhuys introduced me to linear and dynamic programming. I also joined the Western Cape chapter of ORSSA and served on the committee for some years, together with people like Marius Sinclair, Jon Miller, John Lawton and of course Gerhard Geldenhuys.

2. You are currently involved with the application of Multicriteria Decision Analysis (MCDA) to local government. How important is the role of OR at this level in South Africa?

The specific problem we are looking at is that of aligning the capital budget of a municipality with its objectives as embodied in the IDP (Integrated Development Plan). The budget allocation problem is always a difficult one, with many aspects and many interested parties. The role of OR is limited but constructive; I am hopeful that we can influence municipal councillors and officials to adopt more goal-oriented and transparent procedures. Along the way I have noticed another possible application of OR, namely performance management using DEA, and there are undoubtedly others waiting to be discovered.

3. Do you plan to continue in this line of research after your retirement in March 2002?

First we have to complete the present project, which will

hopefully be by the middle of 2002; after that I shall "review my options", as they say! But yes, I would like to stay in touch with developments in local government; I feel that this is one way in which an OR practitioner can contribute to the wellbeing of his/her community.

4. Your tenure at the helm of ORSSA has recently come to an end. What do you consider to be the highlights and lowlights during your time in this position?

What I have enjoyed most has been getting to know members of the executive by working with them to promote the interests of OR and ORSSA. I have been tremendously encouraged by the willingness of extremely busy people to devote substantial amounts of their time to this end. I am also glad that we have been able to strengthen the link between OR and development; ICORD 2001 was especially significant. Hans Ittmann and his executive will, I am confident, follow up this initiative. (See his remarks at the bottom of page 2). On the downside I have to admit to being discouraged by the fact that, for a number of reasons, we have not yet been able to get our membership system working smoothly. That so many members have not yet paid their subscriptions is a cause for concern.

5. How do you envisage OR developing over the next few years in South Africa?

Firstly, on the supply side there are several universities where excellent training is being offered. What is especially interesting is the development of courses containing a "hands-on" component, e.g. that organised by Anne-Marie Pothas at Vanderbijlpark (*Newsletter, October 1997*). I have been privileged to take part this year in a new project-based course developed by my colleagues Jan van Vuuren and Isabelle Nieuwoudt (*Newsletter, July 2001*), and it has been a most rewarding experience. (*Anybody who has information on similar courses offered at other places is invited to send me details. Perhaps we could make this a regular feature! Ed.*)

Secondly, on the demand (employment) side a number of our Stellenbosch graduates have found jobs in the financial sector; it would be interesting to hear from other institutions where their graduates end up. It seems to me that risk management is a rapidly growing field about which we should inform our students. Then I think there is scope for many numerate "middle managers" at all levels of government, especially people who have some training in project management and are able to carry through project plans which would otherwise end up gathering dust. It seems to me that OR graduates could make a real contribution here. Perhaps ORSSA could try to convey this idea to a body like the Civil Service Commission.

6. The ICORD Conference 2001 successfully brought together OR practitioners from around the African continent. In what other ways may ORSSA nurture this relationship?

The new executive is considering this question at the moment, and has asked for suggestions from all ORSSA members. Please send your suggestions to Hans Ittmann. Those people who have access to the Internet can sign on to the user group for OR practitioners in Africa set up by Leanne Scott; the address is

<http://communities.msn.com/AfricanORpractitioners>.

7. Do you have any message for young aspiring OR practitioners?

I am not very keen on giving advice of any kind! However I will say that in my view, OR offers a wide spectrum of possibilities, ranging from the development of mathematical techniques to decision problems where the human factor plays an important - or even a dominant - role. It is important to find the place in that spectrum which best fits one's own strengths and weaknesses. ■

MCM MODELLING COMPETITION

By Jan van Vuuren
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Maties students crowned with success



Young prodigies and their mentor: (Back L/R) C. Mumbeck, Jan van Vuuren (Front L/R) D.F. Malan & D. De Wet

A notable honour was bestowed upon the Department of Applied Mathematics at the University of Stellenbosch, when two of its undergraduate student teams excelled in the annual *International MCM Modelling Competition* this year. This competition is organised by the *American Consortium for Mathematics and its Applications* (COMAP) in association with the *Institute for Operations Research and the Management Sciences* (INFORMS), the *Mathematical Association of America* (MAA) and the *Society for Industrial and Applied Mathematics* (SIAM). This worldwide competition is sponsored by the *American National Security Agency* (NSA) and requires undergraduate students, in teams of at most three, to work on an open modelling problem over a weekend in February each year. At the end of the weekend teams are required to compile a report of their

solutions which is then adjudicated by experts from around the world and placed in one of four hierarchical categories: "Successful Participant", "Honourable Mention", "Meritorious" and "Outstanding".

This year three final year students in applied mathematics at Stellenbosch University, Deter de Wet, Francois Malan and Christopher Mumbeck, worked together on a question regarding wind resistance on bicycle wheels. They had to determine under which circumstances (such as weather conditions, track-angle etc.) it is advantageous to use a solid rear wheel on a bicycle during a race as opposed to using a normal spoked wheel. They built a mathematical model of the aerodynamic forces and moments on the bicycle wheel, and then developed a computer program for implementing the model. Their solution was selected as one of the three "Outstanding" winning solutions worldwide.

In total, 215 teams tackled this problem of which 127 teams were awarded "Successful Participant" status, 58 teams were placed in the

New Sponsor for Student Competition

Over the last month we have been able to secure a new sponsor for our National Student Competition. The SAS Institute (Pty) Ltd has agreed to sponsor this competition for the next three years, starting from 2001. We were thus able to present the winner of this year's competition with a nice cheque for winning this competition! ORSSA would like to express our sincere gratitude to the SAS Institute, and in particular to the MD of the Institute, Mr. Bill Hoggarth, for this very generous sponsorship. SAS has its main office in Houghton in Johannesburg and they market the very well known product SAS which is a world leader in providing business intelligence solutions to customers. ■

category "Honourable Mention", and 27 solutions were judged to be "Meritorious". The three winning solutions were from the US Military Academy (New York), who received the SIAM award for best solution, from the University College, Cork (Ireland), who received the MAA award for best solution and the above mentioned Maties team, who received the INFORMS award for best solution. The prize for the top three teams is the publication of their winning solution in the international journal UMAP later this year, together with a monetary award from INFORMS.

Another Maties team that participated consisted of Hendri Botha, Cobus Jacobs and Izak Snyman, from the same department. Their task was to develop an effective evacuation strategy for predictable natural disasters (such as tropical storms or hurricanes). In particular, they studied optimal flight routing and the prediction of traffic congestion using a mathematical simulation model. There were 281 teams worldwide that worked on this problem, and the solution of the Maties team was placed, together with 64 other teams, in the "Honourable Mention" category.

I was privileged to act as advisor for both the above teams. The aim of the competition is to provide students with the opportunity to apply the knowledge that they have gained from our undergraduate programmes in Applied Mathematics at the University of Stellenbosch to difficult, vague practical problems. It is an opportunity for us to test the quality of our education and our students against first-world standards. In support of this statement, Francois Malan says: "It was interesting to have the chance to compete with teams from around the world, since there is a popular perception that universities in other countries are more advanced than their local counterparts, and this is the only way to see whether we are really competitive on an international level."

This competition has been running for 17 years now and the only non-American teams to have won the competition prior to this year came from Canada and China. This is the first time that a team on the African continent has won the competition. ■

PERSPECTIVES: ANNUAL CONFERENCE

By Jan van Vuuren
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This year's annual national conference was held on Monday 17 September at the Vaal Triangle Campus of the University of Potchefstroom in Vanderbijlpark. The conference started with a splendid river cruise on the preceding Sunday, followed by a barbecue in the lapa. After late registrations on the Monday morning, the conference was opened by Hans Ittmann, who stood in for the outgoing president of ORSSA, Philip Fourie (who could not attend the conference). Following an official welcome by the vice-rector of the university, Prof PJJ Prinsloo, a keynote speech was delivered by Rebecca Roderick of BI-5. Winners of the Tom Rozwadowski Medal for the years 1999-2000 and 2000-2001 as well as of the national student competition were also announced. Contributed papers then followed in four parallel streams, with topics ranging from the use of linear programming to model large decision problems and the use of artificial intelligence when solving optimisation problems to optimal inventory control models and MCDA applications.

My favourite talks included an interesting presentation by Paul Fatti, entitled *Cricket 2003 World Cup: Optimal Assignment of Stadiums and Ticket Sales*, and a very entertaining and enlightening presentation by James Bekker, entitled *Population Based Learning with Applications in Arena[®] Simulation Software*. In the first talk the speaker described the intricacies and politics behind venue assignments for large scale sports events and imparted invaluable hints to less experienced OR practitioners: keep it simple, and go prepared to be flexible when presenting your solution! In the second talk the presenter described in a fascinating manner how a binary convergence method may be used in conjunction with simulation methodology to solve multi-dimensional optimisation problems.

The new executive for the period 2001-2002 was chosen at the AGM. The principal members of this body include Hans Ittmann (elected president of the society for the second time), Esbeth van Dyk (re-appointed secretary of the society) and Theo Stylianides (elected treasurer). The management of the society therefore seems to be in the good hands of three CSIR colleagues for the upcoming years. The financial position of the society was also given a clean bill of health, and various resolutions were adopted at this occasion.



A few young OR practitioners attending the annual conference take time out to enjoy the Vaal riverboat cruise. Left to right: David Coleman, Margarete Louw, Isabelle Nieuwoudt, Stephen Berjak & Stephen Benecke

All and all the conference was a splendidly organised occasion, during which new acquaintances could be forged and old ones reaffirmed. A special word of thanks and of congratulations is due the conference organisers, Anne-Marie Pothas, Dries de Wet and Marthi Harmse, who did a truly marvellous job! ■

Why not become an ORSSA member

This is an open invitation from the Executive Committee to all your fellow OR practitioners and your students studying OR related subjects to consider becoming members of our society. The costs associated are minimal whilst the advantages are numerous. Here are just a few good reasons to join:

- Members receive the newsletter and the official journal (ORiON) of the society, which contain interesting articles as well as activities of the society, thereby keeping them at the forefront of events in the South African OR community.
- Members receive discounts on registration costs associated with annual and other conferences.
- Members are listed in the membership database, which will establish and promote contact with other members of the society.
- Student members may ask the society to publish an abbreviated CV in the newsletter when leaving university or technician; the newsletter is distributed widely around South Africa.

There are three types of membership available. The first is student membership of ORSSA, which costs only R20.00 per annum. Secondly there is individual full membership, which is R80.00 per annum and lastly there is corporate membership, which is R250.00 per annum. If you are interested in joining the society at any of these levels simply visit our website at:

<http://www.orssa.org.za>

and click on "Joining ORSSA?" Complete the electronic membership application form with your personal/corporate particulars and then either submit it online or via the postal services to the secretary of the society, Esbeth van Dyk. We look forward to hearing from your friends and colleagues. ■

WHAT THE STUDENTS HAD TO SAY

By Stephen Benecke
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The 2001 annual ORSSA conference was held in September at the Vaal Triangle Campus of the Potchefstroom University. Arriving for registration, we were welcomed by the scenic beauty of the Vaal River, on which a relaxing river cruise was later to be held. That evening was concluded with a delightful braai.

The conference was held over just one day and, as the keynote speaker, Rebecca Roderick set the stage for an eventful day. Switching rooms every half-hour ensured a lack of boredom, and this was helped on by the wide choice of speakers in every session. Topics ranged from finding good nursing schedules to cryptological applications. Despite this healthy diversity, one got the feeling that computer simulation was an underlying theme.

Refreshments were adequate and frequent and overall the experience was enjoyable and enriching. ■

THE STATE OF OR IN KENYA

By Isaac M Mbeche
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Introduction

OR/MS has huge potential benefits from which developing countries such as Kenya can gain in their quest for growth and development. However, outside South Africa and Egypt, the rest of Africa and Kenya in particular have yet to make effective use of OR/MS. These are countries that are beset with problems of poverty, disease, low levels of education and underdeveloped infrastructure.

OR/MS Activities in Kenya

The major centre for OR/MS activities in Kenya is the Department of Management Science, Faculty of Commerce, University of Nairobi. The Department has an establishment of about twenty-five staff members, who in addition to their OR/MS training come from diverse disciplinary backgrounds such as mathematics, engineering, finance, education and accounting. The group is truly interdisciplinary in composition.

The Department has the responsibility of teaching all the OR/MS courses in the University as well as carrying out research. Consultancy work is also undertaken by staff members either as individuals or in groups. Examples of research and consultancy activities include:

1. Research and consultancy in water projects. Water projects in Kenya experience the problem of cost and time overruns as

well as management problems in post implementation periods. Postgraduate research is being carried out to address these problems.

2. Consultancy in the legal sector reforms. Members of the Department have helped to carry out the baseline surveys to establish where changes are required. They have also facilitated workshops on Total Quality Management and change management.
3. Consultancy in education: Members of the Department have been involved in the early childhood education programme to address issues of quality on this level.
4. Consultancy in the energy sector: The Department has been involved in the on-going reform activities in the energy sector. The involvement has been on consultancy services and facilitation of workshops.
5. Participation in the Africa Training course for planners: The Department, in collaboration with the United Nations Centre for Regional Development (UNCRD) Africa office, takes part in the six week training course for African planners which is held in Nairobi every year in October. The Department also participates in the in-country training activities of UNCRD, especially in Ethiopia.

The Future of OR/MS in Kenya

There is a lot more that needs to be done in order to promote OR/MS activities in Kenya. The way this goal may be realised is to use a three-pronged approach to the promotion viz.:

1. Promotion of student activities through their association called MASSA – MAnagement Science Student Association. The students identify suitable projects such as those concerned with the poverty reduction and work with beneficiaries and other stakeholders. In this way they promote OR/MS.
2. Strengthening teaching and research activities in OR/MS. The main emphasis here should be on developing capacity in the country through training, especially at the Masters and Doctoral levels. This is where support from abroad and also from areas such as South Africa, where OR/MS is relatively well developed, will be welcome.
3. Involvement and networking with OR/MS practitioners. For OR/MS activity to take root in the country, practitioners and academics who are involved in OR/MS related activities must be brought together through some association and promote such activities as conferences, seminars and workshops on OR/MS.

Conclusion

In conclusion, it is important to recognise that OR/MS can make a lot of contribution to the development of Africa and Kenya in particular. Issues such as poverty, HIV/Aids, insecurity, ignorance and governance are beckoning for OR/MS intervention. The challenge to address these issues is a real one. ■

WORLDWIDE CONSULTING

By Costas P Pappas

University of Piraeus, Greece

Critical Cross-Border Issues

The issues raised in a discussion concerning worldwide OR consulting are too many to be addressed in a short presentation. One has to focus on a limited number of questions, which seem to be among the most important.

One such question is, of course, related to what is considered the effective approaches to developing new markets in a new territory. There are certainly standard practices employed, such as co-operation with a local company, but the approaches may differ from case to case.

First, it is necessary to know whom and how to contact. For example, in a market dominated by the state, one has to contact trustful persons from appropriate state agencies and organisations. International fairs may provide good opportunities. Forming partnerships with clients from the mother country that already have developed activities in a new market can open a way to that market, through accompanying and supporting their activities. Co-operating with international auditors, who know what and where problems exist, can also help identify opportunities for consulting across borders in prospective new markets.

Should you set up a local office or operate from a distance? It seems that the answer to this question is not necessarily to choose either one or the other. It may prove more appropriate to initially operate from a distance, then set up a local office (point of reference) with local staff, but with management from headquarters, and try to find alliances.

OR practitioners should be aware of local cultural sensitivities, codes and habits, as these may heavily influence several aspects that are crucial to the success of a project. Religion may be a very important issue. Other issues may be aesthetics, working hours, local organisational structures and codes of contact, language

etc.

Due to globalisation, there are sectors where new opportunities have appeared for consulting across borders, irrespective of location. Such sectors include electronic transactions, logistics, banking and commerce. However, particular sectors may be more promising than others depending on location and time. Examples of such sectors are banking for Panama, transportation for Rumania and construction for Yugoslavia. Some areas of the world seem to have greater need for particular OR applications or approaches (e.g., foresting in Malaysia, agriculture in developing countries).

International prestige in obtaining projects is very important. Branded companies (like Arthur & Little, Coopers, Arthur Andersen, KPMG, Deloitte & Touch and Ernst & Young, to name a few) claim a large part of the market pie due, in large extent, to their international prestige.

The issue of prestige is related to credibility. Credibility in a new market is guaranteed, should a consulting agency be able to select the projects it undertakes and have neither time nor budget limits! However, this is not quite the reality in actual markets. Usually, client organisations make decisions based on cost and completion time, in addition to consultant's experience.

Then how is credibility gained? Usually by results, i.e., by delivering to the client what has been promised. This is subject to parameters not always controlled by the consulting agency. Such parameters, which might negatively affect projects, include political changes (especially for projects in the public sector) and currency fluctuations (especially for the private sector). In other words, in order to be successful, a project also needs to be lucky. In any case, credibility is not the only parameter on which the success of consulting depends. Business consulting (including OR consulting) needs to continuously create new markets and be on the "cutting edge," given that the concept of "life cycle" applies also to OR technology and applications. Of course, having interdisciplinary capabilities is

always helpful and sometimes indispensable for successful consulting (e.g. information systems plus logistics plus finance for ERP consulting). Commitment of top management, availability of the company's people, and sufficient budget and time are also critical factors in making a contract successful.

There are many differences in practicing OR in different places (one might say that there are no commonalities). The differences may refer to issues like the level of analysis, scope, feasibility, competition, laws and institutions, but also to issues like local support and bribes. Also, different methods or techniques may be favoured for the same problem depending on location. For example, "hard" OR methods are favoured when enough data is available, while "soft" methods are the only applicable ones if data is lacking.

Specific special obstacles to implementation of OR solutions in across-borders consulting may include, among others, language, different accounting systems, local laws and regulations, various bureaucratic obstacles, etc. Working in other cultures may present one with difficult cultural or ethical situations — bribing is one of them. Local technical support is necessary in an implementation in the public sector, advisable in the private one. However, sometimes the issue of trustfulness may arise.

To conclude, the OR profession seems to have contributed significantly in consulting across borders and helping solve organisational and operational problems in the public and private sectors of modern societies, including those problems appearing in the way of globalisation. OR is global by its very definition. However, issues of a more general concern, like those related to the most fundamental needs of humanity, including social justice, welfare for all people, freedom and sustainability seem to have not acquired top priority in the criteria of conducting this profession. Fortunately, this discussion has recently been opened in the OR community. ■

Costas P. Pappas is a professor in the Department of Industrial Management at the University of Piraeus, Greece. He has consulted for several international companies.

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BOOK REVIEW

By Maritha Turpin

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In Code

Sarah Flannery, with David Flannery

Profile Books, London, 2000

Price: R123,00

On Wednesday, 6 January 1999, 16-year old Sarah Flannery won the Irish Young Scientist of the Year award for 1999. Sarah's winning project, entitled "Cryptography – A New Algorithm versus the RSA", attracted international attention. Amongst others, she appeared on the front page of the London Times. She was described as a young genius, and as someone who could make a lot of money with her algorithm. Mathematicians and cryptographers were alerted by the news, although, according to Sarah's father, the reason for the sensation was probably the combination of "genius" and "lots of money". The result of the media attention was an invitation from Profile books to publish Sarah's story. That is how this book came to be.

This book is about an "ordinary" girl from Blarney who decided to enter a science competition, much like the Expo competition in South Africa. The book is also an excellent popular introduction to cryptography.

On a personal level, Sarah begins by giving the reader some background about her family life, and where and how she grew up. One quickly notices something special about this "ordinary" family. The Flannery kitchen has a large blackboard, where David, Sarah's mathematician-father, continually writes up puzzles for his children. He does not let them get away with solving these puzzles by trial and error. For example, when he and Sarah covered magic squares, he kept on probing her until she derived a general solution for solving magic squares. One of the

pleasures of this book is the fact that Sarah shares the most delightful of these kitchen puzzles with the reader, in much the same way as her father did.

When the opportunity arises for Sarah to enter the Young Scientist competition, her father encourages her to do so, because of the learning experience involved. Sarah involves the reader all the way in this learning experience: how she decided on a topic, how she came to know more about the subject, how she went about doing her own research, how she experienced the various competitions she ended up participating in, and how she dealt with the attention and publicity afterwards. The fact that she shares information on both the process and her own feelings makes this book good inspirational material for any aspiring young scientist.

Throughout Sarah's journey, her father is there to provide technical advice as well as emotional support. He is also co-author of the book: in order for Sarah not to neglect her schoolwork, he wrote the two chapters containing the necessary mathematical background.

That leads us to the other use of the book, namely an introduction to cryptography. David Flannery really made an effort to make the mathematics accessible to a popular audience, and to keep it relatively easy to follow. At the same time, he provides enough depth and breadth of the subject field to keep the interest of a more serious reader. A reviewer is quoted on the back cover of the book: "If you want to find out how to get from Euclid's theory of prime numbers via Eratosthenes's sieve, Mersenne numbers, Fermat's little theorem and Euler's Phi function to modern number theory, you can. If you want an introduction to cryptography from the old Caesar's wheel to modern "double key" encryption... it is in here".

Lastly, it needs to be said that this book has a definite tension line. Sarah does not only enter one competition, but wins a succession of awards, each time leading to entry into another competition, including two international competitions. In the process, her research grows from a literature study to new work, a new algorithm, and lastly, critique on the algorithm. In the way that Sarah tells her story, she makes the reader part of a real-life mathematical adventure. ■

Schonland: Scientist and Soldier

Coming soon

A major biography of South Africa's most distinguished scientist of the 20th century



Schonland: Scientist and Soldier

By Brian Austin

Profile Books, London, 2000

Price: R123,00

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Schonland: Scientist and Soldier

By B.A. Austin

This is a biography of Sir Basil Schonland FRS (1896-1972). Schonland, the eminent South African physicist, was a major contributor to 20th century British and Commonwealth science, both in peace and war.

Brian Austin has written not just a scientific biography, but a biography, which tells much of a highly placed scientist and administrator, of the increasing engagement between science and the military, and of changing military/diplomatic relationships between Britain and South Africa. ■

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International Publications

OPERATIONS RESEARCH (JOR)**Volume 49, Number 4, July-August 2001**

ERNEST H. FORMAN, SAUL I. GASS, '*The analytic hierarchy process – an exposition*'

CHARLES J. CORBETT, '*Stochastic inventory systems in a supply chain with asymmetric information: cycle stocks, safety stocks and consignment stock*'

PATRICK JAILLET, MATTHEW STAFFORD, '*Online searching*'

KURT HELMES, STEFAN RÖHL, RICHARD H. STOCKBRIDGE, '*Computing moments of the exit time distribution for Markov processes by linear programming*'

JEAN-FRANÇOIS CORDEAU, FRANÇOIS SOUMIS, JACQUES DESROSIERS, '*Simultaneous assignment of locomotives and cars to passenger trains*'

LINDA V. GREEN, PETER J. KOLESAR, JOAO SOARES, '*Improving the SIPP approach for staffing service systems that have cyclic demands*'

HERVÉ CRÈS, HERVÉ MOULIN, '*Scheduling with opting out: improving upon random priority*'

YOSSI AVIV, AWI FEDERGRUEN, '*Design for postponement: a comprehensive characterization of its benefits under known demand distributions*'

CHUNG-PIAW TEO, DIMITRIS BERTSIMAS, '*Multistage lot sizing problems via randomized rounding*'

KEVIN D. GLAZEBROOK, JOSÉ NIÑO-MORA, '*Parallel scheduling of multiclass M/M/m queues: approximate and heavy-traffic optimization of achievable performance*'

INTERNATIONAL TRANSACTIONS IN OPERATIONS RESEARCH**Volume 8, Number 5, September 2001**

W.J. HURLEY, W.J. GRAHAM, '*A note on fantast team selection*'

JUN LI, YONG SHI, '*An integer linear programming problem with multi-criteria and multi-constraint levels: A branch-and-partition algorithm*'

DAO-ZHI ZENG, HARUNORI SHISHIDO, '*Convergence analysis for symmetric arbitration games FOA and DOA*'

MARIA DIMOPOULOU, IOANNIS GIANNIKOS, '*Spatial optimization of resources deployment for forest-fire management*'

CHEN-FU CHIEN, JING-FENG DENG, '*Optimization of wafer exposure patterns using a two-dimensional cutting algorithm*'

NARUSHIGE SHIODE, ATSUYUKI OKABE, '*A computational method for optimizing the shape and location of a polygon on a plane*'

ZUZH SHEN, DUNLI XIE, WEIZUAN XU, '*China's economic reform promotes operational research applications in the processing industry*'

M.H. CORREIRA, J.F. OLIVEIRA, J.S. FERREIRA, '*A new upper bound for the cylinder packing problem*'

AMOS ZEMEL, ISRAEL DAVID, ABRAHAM MEHREZ, '*On conducting simultaneous versus sequential engineering activities in risky R&D*'

YUEZHOU CAI, WENJIANG WU, '*Synthetic financial evaluation by a method of combining DEA with AHP*'

EUROPEAN JOURNAL OF OPERATIONAL RESEARCH**Volume 135, Issue 1, 16-November-2001**

Éric D. Taillard, Luca M. Gambardella, Michel Gendreau, Jean-Yves Potvin, '*Adaptive memory programming: A unified view of metaheuristics*'

Kathrin Klamroth, Margaret M. Wiecek, '*A time-dependent multiple criteria single-machine scheduling problem*'

Anthony Chen, Hong K. Lo, Hai Yang, '*A self-adaptive projection and contraction algorithm for the traffic assignment problem with path-specific costs*'

V. T'kindt, J-C. Billaut, C. Proust, '*Solving a bicriteria scheduling problem on unrelated parallel machines occurring in the glass bottle industry*'

John C. Duder, Moshe B. Rosenwein, '*Towards "zero abandonments" in call center performance*'

Taehan Lee, Sungsoo Park, '*An integer programming approach to the time slot assignment problem in SS/TDMA systems with intersatellite links*'

Barbara Käfer, Stefan Nickel, '*Error bounds for the approximative solution of restricted planar location problems*'

Irène Charon, Olivier Hudry, '*The noising methods: A generalization of some metaheuristics*'

Joseph Sarkis, James J. Cordeiro, '*An empirical evaluation of environmental efficiencies and firm performance: Pollution prevention versus end-of-pipe practice*'

Genji Yamazaki, Satomu Toshimitsu, '*Light traffic in a cellular system with mobile subscribers and its applications*'

T.J. Nye, E.M. Jewkes, D.M. Dilts, '*Optimal investment in setup reduction in manufacturing systems with WIP inventories*'

Masatoshi Sakawa, Ichiro Nishizaki, Yoshio Uemura, '*Interactive fuzzy programming for two-level linear and linear fractional production and assignment problems: A case study*'

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T.C. Edwin Cheng, Adam Janiak, Mikhail Y. Kovalyov, '*Single machine batch scheduling with resource dependent setup and processing times*'

M. Cruz López-de-los-Mozos, Juan A. Mesa, '*The maximum absolute deviation measure in location problems on networks*'

Vladimir Marianov, Daniel Serra, '*Hierarchical location-allocation models for congested systems*'

Margaret F. Shipley, André de Korvin, Khursheed Omer, '*A fuzzy logic-based decision model to satisfy goals for successful product/service introduction*'

Jackie Rees, Reza Barkhi, '*The problem of highly constrained tasks in group decision support systems*'

Local Publications

ORION**Volume 16, Numbers 1 & 2, 2000**

D.C. MONTGOMERY, '*The future of industrial statistics*'

E. VON COLLANI, '*Integrated and objective-oriented statistical process control*'

J. KOHLAS, B. ANRIG, R. BISSIG, '*Reliability and diagnostic of modular systems*'

F. BEICHELT, '*Combinatorial methods in network reliability analysis*'

B. ANRIG, F. BEICHELT, '*Disjoint sum forms in reliability theory*'

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V.S.S. YADAVALLI, M. BOTHA, '*Stochastic analysis of a two unit system with vacation for the repair facility after m repairs*'



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(four posts)**

DEPARTMENT OF STATISTICAL SCIENCES

We invite applications for these four posts for appointment as soon as possible. The appointments may be either permanent or on a contractual basis.

The department has a strong record of broad interdisciplinary work in its teaching and research, being involved in applying quantitative thinking in areas ranging from finance and industrial management to ecology and medicine. Consideration will be given to candidates with interests and experience in any one of the fields of activity of the department, namely biostatistics and quantitative biodiversity modelling, mathematical and theoretical statistics, operational research, econometrics and financial modelling. Preference will be given to candidates with broad interests rather than narrow specialisation in one of these areas.

For appointment at Senior Lecturer level, it is preferable that candidates will have completed a PhD or equivalent degree in one of the above or related fields, and to have a proven track record of post-doctoral research.

Candidates with a Masters degree will be considered for appointment at Lecturer level. This level of post may also suit those in the process of completing a PhD or equivalent degree, or persons with a Masters degree and some years of practical experience in one of the above fields.

Appointments at Associate Professor and Professor levels require evidence of excellent research leadership and extensive scholarly output.

The remuneration packages are negotiable and include highly competitive benefits.

Please send a letter of application, specifying the level for which you are applying, plus your CV (including the names, postal/email addresses, telephone/fax numbers of 3 referees) to:

The Staff Recruitment Office (Ref: 551),
UCT, Rondebosch, 7701
Cape Town, South Africa

by 21 January 2002. However, applications will be accepted up until such time as the posts are filled.

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Fax: +27 21 650-2138
Email: simbayir@bremner.uct.ac.za
Website: <http://www.uct.ac.za>

Upcoming Conferences

Please mark the following dates in your diary

ORSSA National Conference 2002 to be held in the Western Cape
Sunday 8 September - Tuesday 10 September 2002
Further details will follow in the next edition of the newsletter

*SASA 2001 Annual Conference of the South Africa Statistical Association
November 14 - 16, 2001.*

Goudini Spa, Rawsonville, SA

URL: <http://www.uct.ac.za/deps/stats/sasa2001/>

THE SIXTEENTH TRIENNIAL CONFERENCE OF THE INTERNATIONAL
FEDERATION OF OPERATIONAL RESEARCH SOCIETIES
Hosted by the UK Operational Research Society
8 - 12 July, 2002

CONFERENCE THEME:

OR in a globalised, networked world economy.

UNIVERSITY OF EDINBURGH IN THE CENTER OF EDINBURGH,
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- The first IFORS conference of the new millennium
- In the UK, the cradle of OR and the country that hosted the very first IFORS conference
- Aimed at both academics and practitioners
- Closing date for abstracts **15 December, 2001.**

Chair of Program Committee:

Professor Ben Lev, University of Michigan- Dearborn.
blev@umich.edu

Chair of Organizing Committee:

Professor Lyn Thomas, University of Southampton.
l.Thomas@soton.ac.uk

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To be kept up to date with the latest news about IFORS 2002, send an email to ifors2002@orsoc.org.uk having **subscribe ifors 2002** as its subject.



Competitions

IFORS 2002: OR in Development

Due to insufficient number of entries, the deadline for submitting papers for the this competition has been extended to the December 15, 2001.