



Newsletter

Operations Research Society of South Africa
Operasionele Navorsingsvereniging van Suid-Afrika



**ORSSA is helping to Streamline Facility Layout
in the Western Cape Industria**

March/April 2003



ALARPM 6th & PAR 10th WORLD CONGRESS

Sunday 21 – Wednesday 24 September 2003
University of Pretoria, South Africa

Action Learning, Action
Research & Process
Management (ALARPM)

Participatory Action
Research (PAR)



University of Pretoria

In association with the Business School
of the Netherlands, Technikon Pretoria,
Technikon Northern Gauteng and the
Vaal Triangle Technikon

**Preliminary Announcement and Call
for Contributions**

THEME

The theme for the World Congress is **LEARNING PARTNERS IN ACTION**.

Participants can make a selection from the following streams:

- **DIVERSITY IN LEARNING** explores the application of action learning and action research (ALAR) to facilitate learning that takes the diversity of learners into account.
- **REFLECTIONS ON PROFESSIONAL DEVELOPMENT** covers action learning and action research approaches to professional development.
- **ORGANISATIONAL LEARNING AND THE FUTURE OF WORK** explores ALAR approaches to contemporary organisational learning and development issues, as well as future options for employment and the processes of workplace reform and renewal.
- **PARTICIPATION IN SOCIAL AND COMMUNITY DEVELOPMENT** focuses on world communities and the processes they undertake in creating socially useful knowledge for the 21st century in general and the African millennium in particular.
- **LEGISLATIVE AND POLICY ISSUES** deals with current national legislation, and how they may influence the adoption or rejection of an action-learning paradigm in higher education, industry and government.
- **LINKS AND PARTNERSHIPS** reports on joint research projects and collaboration between countries, institutions and organisations worldwide.
- **LEADER PRACTICES** provides evidence of acting the role as leader in the field of ALARPM and PAR practices.
- **UPCOMING RESEARCHERS** will be provided with a platform to present their work in an interdisciplinary atmosphere.

AUDIENCE

All individuals or groups interested in collaborative, reflective and practical improvement are welcome to participate in the congress from:

- Government organisations
- Community organisations and churches
- Industry, commerce and business, including agriculture, health, tourism and consulting firms
- Public or private (higher) education institutions (such as universities, technikon, polytechnics, colleges, schools)

CALL FOR CONTRIBUTIONS

You are invited to submit proposals for contributions that address the congress theme *Learning Partners in Action* in the usual form of presentations, panels, symposia, papers, workshops, posters or innovative alternatives. All proposals must be in English. In the spirit of ALARPM and PAR, proposals for presentations that reflect active participation of the audience will receive favourable consideration.

Preparation of your submission

Submissions in the form of a précis should not be longer than 500 words.

The following is important

- The title of your presentation
 - Names and affiliation of all authors
 - Name, address, telephone, facsimile and e-mail of the proposed presenter
 - Preferred stream for your abstract
 - Form of presentation (paper, workshop, poster, etc. or alternative form of presentation)
 - All texts should be typed
- E-mail or send 4 copies of your submission to: Dr Tessie Herbst, Bureau for Staff Development, Technikon Pretoria, Private Bag X680, Pretoria 0001, South Africa or E-mail: tessie@ptatech.ac.za.
Copy to: xdefortier@gk.up.ac.za

Important dates and deadlines/Critical dates

Submission of abstracts:

30 April 2003

Notification of acceptance of abstract:

10 May 2003

Final date for submission of paper for peer review:

20 June 2003

Notification of acceptance of paper for peer review:

15 July 2003

Congress website:

<http://www.education.up.ac.za/alarpm>

ALARPM website:

<http://www.alarpm.org.au>

FROM THE PRESIDENT'S DESK

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



Hans Ittmann

As President of ORSSA it is indeed a privilege to interact with you, members of the society, in this way. Another new year has dawned upon us and it is amazing how fast the first three months have just flown past us. I trust that you are all attending to and solving the complex and difficult problems we face in South Africa, the problems our discipline has equipped us to tackle and solve. May you all be successful in these endeavours!

Towards the end of last year I received a Terms of Reference for the design, planning, development and testing of commercially viable and environmentally sustainable business models. It is part of an initiative of the Department of Trade and Industry that was launched in 1999 to revive rural economics by making use of their inherent natural resources to create sustainable commercial enterprises. This is a worthy cause and critical for a developing country such as ours. What intrigued me is the following and I quote two paragraphs verbatim from this Terms of Reference:

“Modelling for public service delivery is rare in South Africa. To a large extent, existing service delivery programmes are input-oriented rather than outcomes-based. Often, situations where modelling is applied, it is technocrats such as engineers who seem to prevail over technical solutions. The perception created is that modelling is a technical rather than a practical, simple approach. The common difficulty can be noted from the configuration of a database which is often manipulated into mathematical equations, which are meant to justify alternative solutions.”

However, it is important to also note that modelling is a science which allows for design methods, specifications and applications. It offers a range of solutions which are critical during decision-making processes. Using equations and computer software is a tool to align one's work within the complex world of decision-making and pro-active management practices. Depending on its application, modelling can be analytical, conceptual, quantitative and qualitative.”

Obviously the above is the perceptions of someone involved in this initiative. Two things in the first paragraph struck me. Firstly, there is the lack of modelling (or the use of OR in the broader sense) for service delivery in the public sector, something which I am very aware of in my own environment and which I struggle with in terms of how to change. Secondly it portrays a perception of modelling being overly technical and being used to justify different solutions. As operations researchers we need to guard against creating such a perception. In the second paragraph

the author tries to indicate the value of modelling. We need more of these kinds of supporters, or champions, in the public sector environment, people that understand the value of models, and the process of developing them to support decision making!

Many things have happened since our last newsletter and I would like to share some of this with you. Firstly, Theo Stewart, Professor of Statistical Sciences at the University of Cape Town, a very active member of ORSSA over the years and also a very prolific author of research articles and books, has been elected as Vice President at Large of IFORS, the international OR body. This is not only a huge honour for Theo, but also for us as a society. Theo, congratulations on this outstanding achievement and we wish you all the best for your term of office in the IFORS Executive!

As you all are aware, IFORS holds its conferences every three years. The last conference, IFORS 2002, was held in Edinburgh while IFORS 2005 will take place in Hawaii. Bids for the IFORS 2008 conference had to be submitted by 1 January 2003. As an Executive we decided that ORSSA should submit a bid and with the very capable assistance of people from the Sandton Convention Centre, our bid went in towards the end of last year. Paul Fatti and Gys Wessels assisted me from ORSSA's side, so thanks to them as well. A few days ago I received an e-mail from the IFORS president which is very positive. They do need us to clarify a number of issues around the bid. This we will do, feed it back to IFORS and keep our fingers crossed. We could be in a position to host IFORS 2008 here in South Africa!

During the last year or two the international OR community has started with different initiatives focussing on Africa. The aim is to promote OR in this continent and to assist countries to get formal structures in place. In this regard, a conference was held early in January this year on the west coast of Africa in Burkina Faso. In addition, the Operations Research Society of East Africa (ORSEA) will be hosting their first conference in Nairobi, Kenya, on 17 to 19 September 2003. I had the opportunity to visit Nairobi in February and met with the organizing committee. This committee consists of people from Kenya, Tanzania, and Uganda - all very committed and enthusiastic about this conference. From our side we need to give them all our support and I would like to urge our members to consider it seriously to present papers at this conference. The conference location and facilities in Nairobi is of an acceptable standard. I'm convinced it will be a great experience to assist and support our fellow Africans in getting OR off the ground in this region. The conference call for papers is distributed with this newsletter. Our own ORSSA conference is taking place in Pretoria in the week before the Nairobi conference. I realise it could be a tough call on many of us, time wise, but this is history in the making!

Binne ONSA is, en was, ons beleid nog altyd om enige artikel, korrespondensie, ens. in Afrikaans of Engels te publiseer. Aangesien ons nuusbriefflesertal nou ook meer en meer mense uit Afrika insluit, is dit sekerlik so dat ons artikels oorwegend Engels

is. Dit beteken nie dat ons Afrikaans doelbewus afskeep nie, en artikels in Afrikaans is nog steeds baie welkom! Geniet hierdie uitgawe van die nuusbrieff wat deur Leo Tome, ons nuwe redakteur, saamgestel is.

I trust that you will enjoy this edition of our newsletter! Thanks to our new editor, Leo Tome, for this edition. As you can see there are already a number of changes that contributes to our newsletter looking even more professional.

OUR OWN IFORS VICE-PRESIDENT



Theo Stewart

We would like to congratulate Theo on his election as vice-president of IFORS. This is only one of the many highlights of his illustrious career in OR.

It can probably be said that his career in OR started in 1971 when he started to work at the National Research Institute for Mathematical Sciences of the CSIR. He stayed at the CSIR until 1983, with his final position being Head of Operations Research and Statistics.

Theo was founder-editor of ORION, the journal of the Operations Research Society of South Africa (ORSSA). He also served as editor for the newsletter from 1972 to 1975. Later he was also president of ORSSA as well as the South African Statistical Association, and has been awarded the Tom Rozwadowski Medal on five occasions. Theo has also trodden deep steps in the world of Multi-Criteria Decision Analysis, finally sharing his experience and knowledge in his book, MCDA: An Integrated Approach. In addition to all this he has served on the editorial advisory board of no less than four international journals: Journal of the Operational Research Society, Journal of Multi-Criteria Decision Analysis, International Transactions in Operations Research and OMEGA – The International Journal of Management Science.

Once again, from all of us at the society, congratulations. We hope that you have a very enjoyable and successful term in office.

The above information was taken from an article by Stephen Berjak in the June 2002 issue

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.

FROM THE EDITOR



Leo Tomé

During the general meeting, at the 2002 ORSSA conference at Goudini, the possibility of having the newsletter only in electronic format was discussed. This was due to rising costs and the financial strain put on the society. I, however, believe that having a newsletter in printed format is essential, and as new editor I set myself the task to make the newsletter as affordable to the society as possible, but still maintain the present standard.

You will surely have noticed some changes. These changes were made possible by the fact that we now have advertisers. At this point I would really like to thank Stephen Berjak, my predecessor, for the work he put into the newsletter. This enabled me to take the next step and approach possible advertisers. Stephen has also just completed his PhD and I would like to wish him all the best for the future.

I really enjoyed this new experience, and would like to thank those people who supported and encouraged me in implementing my new ideas.

We would like to start a regular letter column. So please send me your letters expressing your opinions and ideas on issues regarding OR, our society, etc. But please do not just send me letters but also bombard me with your articles, sharing, through the newsletter, your experience, knowledge, and enjoyable events.

I hope all of you enjoy this newsletter as much as I enjoyed putting it all together.

Until next time,

Leo Tomé

(ldtome@dip.sun.ac.za)

Cover picture

From the left: Jean le Roux, Margarete Louw, David Coleman

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MEMBER PROFILE: WIM GEVERS

By Leo Tomé

University of Stellenbosch

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Wim Gevers

Wim Gevers currently lectures in Operations Research and Computer Competency and has also taught Business Statistics and aspects of Financial Management at the University of Stellenbosch Business School. He supervises research students both at MBA and Doctoral level. His research focuses more on financial modelling, with specific interest in the association between accounting information and share price behaviour. Wim also served the society well over the years. He serves on the Western Cape executive of ORSSA and also served on the National Executive of the Operations Research Society as business manager of ORION, the journal of ORSSA since 1993. He has been vice president from 2002 onwards, and was elected to be president from the end of 2003.

I posted the following questions to Wim:

1. When and why did you first become involved in OR and ORSSA?
2. You started out your career as a Civil Engineer, how did you find your way to the more financial side of mathematics?
3. What would you consider to be the highlight of your career in operations research?
4. You are the next president to be, what challenges do you see during your term that would need to be addressed, and how will you face them?
5. Do you have a message for young aspiring OR practitioners?

This was his response:

I presume that my first involvement with Operations Research was when I was studying civil engineering at UCT and as part of my masters in structural engineering I did a course in mathematical programming. I knew nothing about OR at that stage, but structural engineering was very mathematical and I was going to write software for my thesis so the course seemed appropriate. During the first lecture, the lecturer said that if anybody thought that the course was about computer programming he had to disappoint them and suggested that the students rather enrol for a different course. Being too embarrassed to display my ignorance I stayed and received my

first introduction to an area of Operations Research, but it was very theoretical! I was a little interested in the optimisation of lattice structures but as I got more involved with finite element analysis, the interest waned.

I joined the consulting engineers Liebenberg and Stander and was involved with the design of bridges from the start. I was very fortunate to have been involved with the design of the major bridges on the garden route: firstly Gouritz river bridge and later Bloukrans bridge. Later I was responsible for the model that was used to model the incremental launching of the arches of all three of the arch bridges on the garden route toll road. After a number years and lots of technical work I felt the need to expand my learning horizons and embarked on a part-time MBA at the University of Stellenbosch. During the MBA programme I did courses in quantitative methods that reintroduced me to optimisation – but at that stage I still did not know the proper name of the subject area! I got a liking in the financial side of management, because it was the most quantitative.

After the MBA, and still working in consulting engineering, I was invited by the business school to teach the quantitative methods courses on a part time basis and a year later I joined the full-time academic staff of the Business School at the University of Stellenbosch. At the Business School I met Trevor Wegner and he suggested that I join ORSSA which I did in 1982. Since then I have been fairly active in the society, and have been the business manager of ORION for the past 9 years.

In the academic world I have focussed more on financial modelling, with specific interests in the association between accounting information and share price behaviour. The change from engineering to finance is in fact not that big – to a large extent it is the application of mathematics to technical or financial problems. The underlying principles of the problems seem to be much better understood in engineering than in finance!

Teaching Operations Research at a business school does not place you in the main stream of operations research – students are generally more interested in Strategy, Marketing or Finance. As such I feel myself as an ambassador for OR – showing to business managers how they can improve decision making, using modelling. The most exciting development for me was the development of an add-in for Excel that has put modelling abilities within reach of any user of office software. In addition OR is a wonderful integrating subject in an MBA programme – it has application in virtually every area of management.

In the beginning of my career I was building bridges. In my role as future president of ORSSA I would like to continue building bridges. Modelling to support decision making has become quite prevalent, especially due to very sophisticated software packages that have been developed. Many business users of these packages know little of the underlying principles that govern effective use of the software. That is the area where

ORSSA members are specialists and well positioned to bridge that gap, and where I would like to make a contribution.

To all young aspiring operations researchers I would like to say that this discipline is one of the most exciting that you can conceive. It gives you the opportunity to get involved in a wide variety of real life problems and provide solutions. And if you were to advance into a management position later in your career, I feel that the training in logical decision making will stand you in good stead, since common sense solutions are logical – but common sense is a trait that is not too common!

A NEW WEBSITE FOR ORSSA

By **Jan van Vuuren**

University of Stellenbosch

Vuuren@sun.ac.za

At the executive meeting held at Goudini on Sunday September 8th, 2002 a decision was taken to redesign the website of the Society. In addition to a “new look” for the website, a need was identified to be able to transact the business of the Society more widely in an electronic format via our website. Therefore features, such as being able to join the society online, members being able to pay membership dues online and members being able to update their personal details on the Society’s database were included in the new website design. The launch of the new site is planned for the second half of the year, and the site will consist of a main page containing information on OR in general, ORSSA and its mission & activities in particular, as well as links to the following subpages:

1. **Executive office subpage**, where the executive can hold e-meetings.
2. **ORiON subpage**, where online (*.doc and *.pdf) versions of the journal (all past abstracts and recent full papers) will be placed online.
3. **Newsletter subpage**, where the news-letter will be placed online.
4. **Archive subpage**, containing interesting documents of the Society, for future reference.
5. **Awards subpage**, where recipients of the Tom Rozwadowski medal, the Franz Edelman Prize, the OR in Development Prize, etc will be listed.
6. **Competitions subpage**, form which contestants will be able to submit contributions for the Rozwadowski run, the annual student competition, etc electronically.
7. **Tertiary Institutions webpage**, where institutions offering OR-related degrees will be listed, for the benefit of school kids.

8. **History of ORSSA subpage**.
9. **Other OR societies subpage**, containing links to and info on IFORS, EURO, etc.
10. **Chapter subpages**, where the 5 chapters of the society can publish & advertise their activities.
11. **Special interest groups subpage**, a forum for groups like the MCDA group, the Simulation Group, the Military Game Theory group, etc.
12. **Conferences subpage**, listing information on past conferences as well as a link to the official webpage of the upcoming annual conference.
13. **Advertisements subpage**, containing advertisements of OR-related products, publications, software, etc.
14. **Membership database page**, from which new members may join the Society online, old ones may retire online, current members may pay membership dues online and/or update their personal information, or find other members of the Society. This facility will be password protected, with different levels of access, varying from full access by the treasurer, partial access by the executive to limited access by members.
15. **Photo gallery**.

If you have any ideas, suggestions or criticisms about the above design, please contact Jan van Vuuren at the email address provided above.

Mario Lucertini Prize 2003



Prize of € 1.300,00

The Italian Society of Operations Research, Optimisation and Decision Sciences, AIRO, offers a prize of euro 1.300,00 in memory of Mario Lucertini to be awarded to a scientific article by a young researcher in Operations Research of any nationality.

The Call for Nominations and more details on the competition can be found at the following web site:

www.beopt.eu.org/eng/activities/prizes/lucertini/call_part

Or the secretary can be contacted at: segreteria@airo.org

Deadline: May 31, 2003.

ORSSA is helping to Streamline Facility Layout in the Western Cape Industria

By Jan van Vuuren (vuuren@sun.ac.za) & Margarete Louw (mlouw@dip.sun.ac.za) from the University of Stellenbosch

Task scheduling is and has always been a central concern of managers at production plants. This is especially true for production processes in which production batches are to be kept together, because of a number of reasons: (i) idle batches (*i.e.* batches awaiting processing) typically take up considerable storage space and may therefore clutter necessary floor space around processing machines, and (ii) switching between the processing of different batches at any machine usually incurs a machine set-up cost, which is a function of the relative differences between the previously processed batch and the batch to be processed next on a particular machine. The former difficulty is normally somewhat alleviated by transporting idle batches away from machines on which they have undergone processing to some central storage space, until such time that they will next be processed, whilst the latter difficulty is usually addressed by attempting to schedule batches for consecutive processing on a certain machine which have similar properties (in terms of the kind of processing to be performed on that machine). The problem confronting managers is usually to decide when and in what order to schedule the entire production process (typically containing a large number of batches at any one time) so as to minimise the cost associated with these two (conflicting) difficulties, while also aiming at meeting production deadlines.

The situation described above is certainly a concern at wood product producing factories. There are a number of these factories in the Parow, Kraaifontein and Brackenfell industrial areas of the Western Cape. These plants typically manufacture wooden panels and other components to be used in the construction of doors, cupboards, counters and other furniture items. The particular production sequence of each batch of (or order for) wooden components depends upon the nature of its subsequent use, and may comprise a variety of combinations from a number of basic operations from the following list (which is by no means exhaustive):

- Cutting raw materials into the correct dimensions. This is performed on a so-called *panel saw*.
- Edging components, so as to produce user-defined edge patterns. This is performed on a machine called an *edge bander*.
- Planing wooden products. This is done on a machine called a *planer*, (shown in Figure 1.) If large quantities of wood need to be planed, then a machine called a *four-side planer* may be used.
- Sanding surfaces of components, so as to achieve a smooth finish. This may be done manually at hand sanding tables, or on a machine called a *wide-belt sander*.
- Spraying/staining/varnishing components, so as to produce wood of a glossy texture and/or darker colour.

This is done in a pressurised *spraying booth*.

- Usually products are packaged, using bubble-padded plastic at a facility, called the *wrapping unit*.

Orders or batches have to be kept together, because the surfaces of components in a batch have to match in appearance (*i.e.* their veneering should exhibit similar flaming, their staining colours should match, *etc.*).



Figure 1

A team of five operations researchers is currently involved in a project in which the aim is to develop a decision support tool for the complicated scheduling decisions that have to be taken on a daily basis at a particular wood product producing factory in the Western Cape, who prefers to remain anonymous for competitive reasons. This team consists of three academics and two masters students from the University of South Africa and the University of Stellenbosch. The two masters students (in operational analysis) at Stellenbosch, Margarete Louw and David Coleman, are considering the development of an automated decision support system for their masters theses under the supervision of Jeanne le Roux (from the Department of Quantitative Management at UNISA) and Isabelle Nieuwoudt & Jan van Vuuren (both from the Department of Applied Mathematics at Stellenbosch University). Jeanne and the two students appear on the front page of this newsletter during a visit to the factory site, inspecting the working of one of the machines at the plant, as well as assessing the amount of clear area around the machine that is required by operators. David, Isabelle & Jeanne also appear in heated debate during the same visit to the factory site in Figure 2. Although the students are both working on the same problem for the research components of their degree programmes, they are employing different methods from the impressive arsenal of operations research techniques that have been developed over the years. Margarete is using integer programming and flow heuristics from the realm of graph theory to tackle the problem, while David is using a combination of computer

simulation and neural networks. The end product will be a user-friendly MS Windows-based program to aid plant managers in their scheduling decisions, using the different methods to come with alternative scheduling suggestions in real time.



Figure 2

The students started their studies by frequently visiting the site for the purposes of observing the current operation of the factory, understanding the considerable difficulties of and subtle sensitivities associated with the scheduling process, and to collect data with respect to the number and timing of orders, processing requirements for different orders and the time-spans required for different processes within the production of orders. This was followed by a critical evaluation of the current layout of machines and production workstations on the factory floor. The management of the plant indicated that they would be prepared to change the current layout if it could be demonstrated to them that the proposed changes would be financially beneficial, especially since they were considering buying new equipment, which may influence the layout anyway.

The students embarked on a comprehensive survey of literature to find out what methods have been used in the past to streamline or optimise (in some sense) facility layout in factories. They found

the question of facility layout to be even more important than they had thought at the outset: one reference stated that facility layout directly influences handling cost, which makes up between 30 and 75 percent of total manufacturing cost at a typical production plant. There are usually five broad questions that arise during the layout decisions:

1. What workstations should be included in the layout plan?
2. How much space does each workstation need?
3. What is the capacity of each workstation?
4. How should each workstation's space be configured?
5. Where should each workstation be located?

The layout of a factory has many practical and strategic implications. Proper layout facilitates the flow of materials and more efficient utilisation of labour and equipment. Efficient layout may also reduce hazards to workers, improve employee morale and aid communication between workers and/or between supervisors and subordinates. The layout decision maker is faced with a large number of choices, such as whether to plan for current or future needs, whether to select a single-story or multi-story design, whether or not to open up the planning process to employee suggestions, what type of layout to choose, and what performance criteria to emphasise.

The students uncovered a rich array of methods to solve facility layout problems, each addressing some subset of the above considerations and criteria, and ranging all the way from the qualitative to the quantitative, and from heuristic to exactly optimal procedures. They decided to incorporate a number of these methods into an intermediate decision support tool, which could be used by management to resolve their layout problem. The idea is that once a final layout decision has been made by the plant management, the students will go ahead with applying scheduling methods for the resulting factory layout.

Due to space constraints only one procedure is described here, which is aimed at the single objective of minimising material

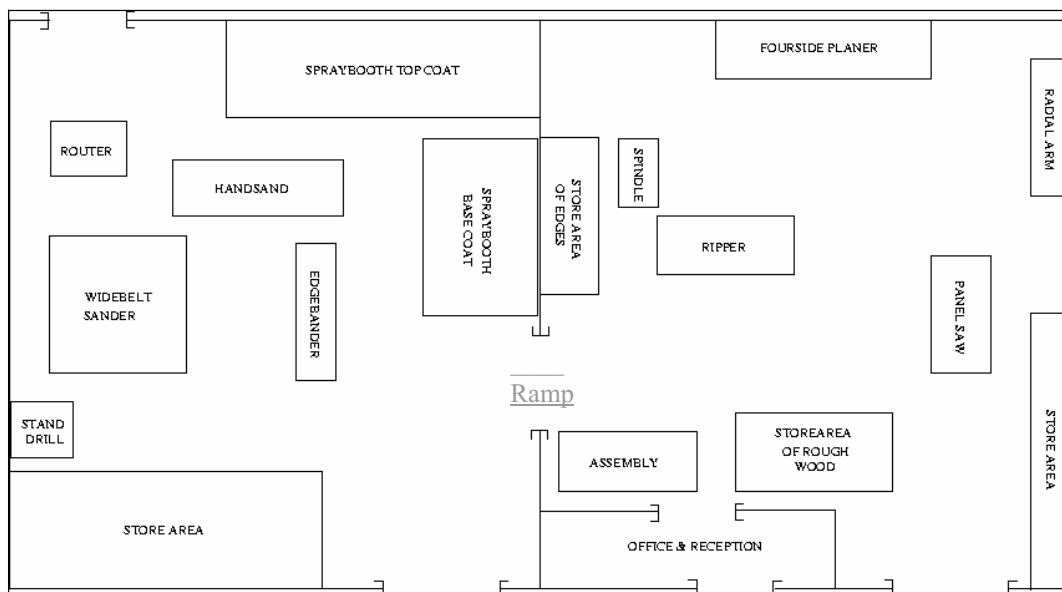


Figure 3

handling cost. The current layout of the factory is shown in Figure 3. Note that there are two warehouses with a ramp in between. The ramp has an angle of approximately 15°, so moving wooden components (on a trolley) up and down the ramp is expensive in terms of time and work force utilised. Each time components are to be moved from one warehouse to another, a number of workers have to be assembled to push the trolley up or down the ramp: at least two to three workers are needed to push the trolley up the ramp, while transporting goods down the ramp is more expensive, since at least three to four workers are necessary to slow down the trolley, which is capable of accumulating an impressive momentum down the ramp. This procedure is shown in Figure 4. The layout objective is to minimise the material handling cost between all pairs of machines, and in particular over the ramp, whilst simultaneously incorporating potential relocation costs of machines.



Figure 4

During their numerous visits to the factory the students accumulated 9 months of order quantity and sequencing data. Hence they were able to quantify the amount of wood that was transported between all machines during this time. This was taken to be representative of average order quantities and sequences, so that the flows (in square metres) of wood in the screenshot of Figure 5 could be computed.

From\To	Receive	Panel Saw	Radial Arm	Ripper	Planer	Fourside	Spindle	Products	Flow
Receive	0	9442.051	0	0	130.684	0	0.2	VDE	716.882354
Panel Saw	0	0	0	0	0	963.549	246.685	Call & Ven Sand	161.626038
Radial Arm	0	0	0	0	0	0	0	Spray Lacquer TC & BC	586.867116
Ripper	0	0	0	0	0	0	6.249	Spray Stain TC	95.186059
Planer	0	0	0	6.248	0	0	0	Cut	7130.653315
Fourside	0	0	0	716.882	0	0	0	Edge	521.346711
Spindle	0	493.33	0	0	0	0	0	Cal Sand	8298.210963
Edgebander	0	0	0	0	0	0	0	Ven Sand	3316.195214
Assembly	0	0	0	0	0	0	0	Shaker	246.685168
Base Coat	0	0	0	0	0	0	0	PAR	115.49575
Top Coat	0	0	0	0	0	0	0	Spray TC & BC & Cal Sand & Veneer	1.078
Edgebander	0	9.877	0	0	0	0	38.034	Spray TC & BC	5.448178
Wrap	0	0	0	0	0	0	0	Cut, Edge, Groove	38.034
Drill	0	0	0	0	0	0	0	Cut, Edge	15.788004
Widebelt	0	0	716.882	0	0	0	246.685	Cut & Flout	0.134
Handband	0	0	0	0	0	0	0	Spray TC & BC & Edge & Cut	9.8769
Dispatch	0	0	0	0	0	0	0	BOARD	416.57348
								Spray BC	49.30471
								CDE	43.839171
								Edge, Cal Sand	9.78817
								Cut, Spray	20.097004
								Spray Lacquer TC & BC, Call & Ven S	1.43636
								Cut, Edge, Cal Sand	15.514276
								Cut Assembly	5.011728
								Spray TC & BC, Edge	1.375
								Cut, Cal Sand	28.233354

Figure 5

The available floor space was then parameterised by a grid, whose points represented possible locations of machines. The flows and grid-points were then used to formulate and solve a mathematical

programming problem whose objective is to minimize

$$z = \theta(\text{handling cost}) + (1 - \theta)(\text{relocation cost})$$

$$= \theta \sum_{i=1}^n \sum_{j=1}^n \sum_{k=1}^I \sum_{h=1}^J f_{ij} X_{ik} X_{jh} d_{kh} + (1 - \theta) \sum_{i=1}^n \sum_{k=1}^I C_{ik} X_{ik}$$

where

$$X_{ik} = \begin{cases} 1 & \text{if workstation } i \text{ is located at point } k \\ 0 & \text{otherwise} \end{cases}$$

n = number of machines

I = the set of available points for machine i to be located

J = the set of available points for machine j to be located

$$f_{ij} = \text{flow between machines } i \text{ and } j \left[\frac{\text{m}^2}{\text{time}} \right]$$

d_{kh} = distance between points k and h [m]

C_{ik} = cost of installing machine i at point k [R]

θ = scaling value to compensate for different units of the objective function (no conversion available) $\theta \in \mathbb{R}$

The distance between two grid-points d_{kh} was taken as a linear combination of physical rectilinear distance and of a factor representing traversal of the ramp (if necessary), *i.e.*

$$d_{kh} = \rho(\text{physical distance}) + (1 - \rho)(\text{ramp cost}).$$

One of the students developed a computerized decision support tool, running on Microsoft Visual Basic 6 and using Lingo 8.0 to solve the above location problem. This system is capable of producing a graphical output as suggested layout, as shown in Figure 6.

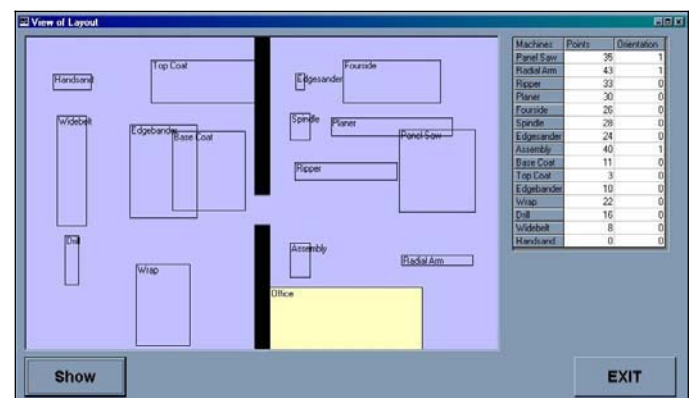


Figure 6

Once refined, this intermediate decision support tool will be delivered to the production plant management. It is expected that a final layout decision will be taken by the end of April, and will be implemented during May this year, after which the second phase of the project will begin, namely to develop a scheduling decision support tool, given the layout decided upon. Both the students and the academics supervising them have found this first phase of the project immensely exiting and instructive. They look forward to the even more challenging second phase of the project, outlined at the start of this article.

Government could aggravate SAS's identity fraud problems

South African government already faces substantial identity fraud problems. Government (e-government) - already big in Europe - will help crack down on this. It moving to an e-government platform could create problems of its own.

ews, however, is that business intelligence software can be used successfully for fraud detection and prevention in an e-government environment.

ving crimes worldwide is the theft says Bill Hoggarth, managing the leader in business intelligence. e crime. The only information ty number, credit card information, ation. The data is taken without either in the form of stolen or mation illegally acquired online."

ife and from all over the world ity theft.

everal people have been arrested e identities. Six Eastern Cape re arrested for stealing pension ing false documentation and ID chers were arrested in connection -million after diverting the salaries ers into bank accounts they set he Home Affairs office in sted for allegedly helping illegal nts.

ty fraud include Steven Spielberg, er US presidential candidate Ross BI has hailed identity fraud as the ollar crime.

scribes identity theft as "the \$24-03 IT Outlook report.

theft will escalate in 2003. Total nsurers, business, merchants, nancial industry are expected to three-fold in 2003, to \$24-billion.

Common purchase points can also be uncovered - is there a business providing a wide range of information about this credit card, such as a frequently visited restaurant?

"SAS' fraud detection solution enables companies to identify and deter any form of fraudulent activity," says Hoggarth. An integrated part of the SAS solution for CRM identifies factors that are difficult to detect manually, leading to reduced fraud and increased profitability."

About SAS's Fraud Detection Solution

Fraud can take many guises such as trading fraud, money laundering, credit card fraud, and identity theft. Fraud has always been a risk to businesses but it is becoming infinitely easier to perpetrate fraud, as money is no longer pieces of paper but bytes of data. Fraud detection is therefore crucial to businesses to stay one step ahead of the perpetrators. It can be defined as the process of detecting and understanding fraudulent actions in order to take corrective measures before, during, or after fraudulent activity, thus reducing and, where possible, eliminating losses associated with fraud.

SAS' fraud detection solution utilises a combination of data mining, data warehousing and exception reporting to allow IT departments to:

- Identify suspicious activity
- Track intrusion occurrences
- Set appropriate sensitivity levels for online intrusion detection systems
- Automate the offline intrusion detection process

SAS Fraud Detection Solution: components and capabilities In order to solve these problems, the first step is to detect intrusions and formulate patterns for suspicious behaviour that can be used to detect future incidents - intelligent prevention is always better than a cure. Intrusion detection systems collect information from various vantage points within a computer system or network and analyse that information for symptoms of system breaches.

SAS software solutions help customers uncover the potential of their data, and consolidate sources of data contained in their systems into an integrated data warehouse to provide a complete view of the data.

The SAS solution allows organisations to use data mining techniques to identify and analyse conversations and addresses an organisation's fraudulent behaviour. This data can be used not only to uncover patterns and occurrences but also to identify potential areas of concern across the enterprise infrastructure.

Through the continual improvement of data mining technologies and the tracking of data mining techniques, the fraud detection capabilities of SAS' customers are able to build a track record of intrusions over time and develop models based on normal behaviour.

Based on SAS' prediction and analysis, the detection solution includes:

Fraud exploration - Companies can use this to gain a better understanding of their transactions, defining the reasons for transactions, this leads to prevention decisions.

Fraud prediction - Organisations can use this to identify fraudulent or not, or to predict areas of fraud, which ultimately leads to prevention decisions.

For more information visit

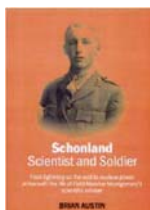
www.sas.com

or contact our SAS

on Johannesburg 01

Cape Town 021 6





Schonland: Scientist and Soldier

by **Brian Austin**.

Institute of Physics Publishing and
Witwatersrand University Press (hard cover,
639pp.) R 280. ISBN 0 7503 0501 0

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

Basil Schonland, first president of the CSIR, was selected as the South African “Scientist of the Century” in 1999. In addition, and this may interest operations researchers in South Africa specifically, he was possibly also one of the first operations researchers from this country. It is not often that biographies of South African scientists are published and therefore it was with great expectation that I read **Schonland: Scientist and Soldier**. The book outlines the life of a remarkable person that left many monuments along the way, not only in South Africa, but also in the UK. The book also gives one an impression for how science was practiced in South Africa during the first part of the previous century. The author of this book, Brian Austin, an engineer and ex-South African now living in the UK, unravels the different phases of Schonland’s life through twenty-five fascinating chapters.

It becomes very clear early on in the book that Schonland was a remarkable person. He was born in Grahamstown and passed his matric at the tender age of fourteen. In doing this, he obtained the highest mark in the whole of South Africa! Shortly there after, he obtained his BA degree with Physics as his major. Throughout the book this aspect stands out, everything this exceptional man tackled turned into success. He was, not only, a good student but he interacted very well with people, he was a great lecturer and a very competent administrator.

He decided to do his post-graduate studies at Cambridge University in the UK. After writing a Mathematics entry-exam war threatened the whole of Europe and the patriotic Schonland immediately joined the signal corps of the army. This was very typical of Schonland as he felt a very strong desire to do his bit for his country during the war period. At a very young age he was promoted to serve as an officer and in this capacity he contributed significantly to “wireless” communications on the battlefield. He had quite a large number of men under his command. Soon after the war ended, he wrote a scientific article to outline the whole aspect of “wireless” communications and how it was used to the benefit of the UK troops. This illustrated the scientific mind of this man.

After the war, Schonland went back to Cambridge to do research for his doctorate in nuclear physics. He was accepted by Cavendish laboratory, an institution that was considered the top experimental nuclear physics laboratory in the world at that stage. This part of the book makes for fascinating reading as it covers an exciting period not just in the life of this young South African, but also gives a view of the fascinating nuclear physics research that was being conducted at this highly

regarded institution. Ernest Rutherford, for example, director of Cavendish and Nobel Laureate was only one of the many famous physicists working at this laboratory. It is in this environment that Schonland made a name for himself as a highly capable researcher. His work was focussed on “The scattering of β -particles”. It is during this time that Schonland meets his future wife the South African born, Ismay Craib, who was doing her post-graduate studies in history in the UK.

The next phase of his life covers his return to South Africa to lecture at UCT. He still had to complete his doctorate even though the facilities for research were very primitive compared to what he was used to in the UK. He was also very isolated from the international research community. This lead him to do something very different and his research interests moved towards the study of lightning. This is described very eloquently in the book, even in a great deal of technical detail. The people issues in his working environment are highlighted and one realises that even though this was a different generation, people don’t really change! He wanted to get to know and understand more about the electrical field around lightning. This research lead him to the Highveld area where he was subsequently offered a chair by WITS as well as the directorship of the newly formed Bernard Price Institute. During that period, Schonland was soon considered as one of the leading researchers in the lightning field internationally. As the head of the BPI he was able to attract a lot of funding to the institute as well as bright young researchers.

Then the second world-war started, and again, Schonland, got involved. This time it was a new invention, radar, which had to be deployed very quickly, also in South Africa, under huge secrecy. This section of the story is compelling reading and it confirms the view that South African researchers who were involved were very capable and focussed. Schonland and his staff were able to build a radar set on the roof of the BPI within three months. This was done based only on sketches that they had received from the British! On 16 December 1939, the radar was operational and, from the top of the BPI building, it could detect an aircraft. Very few people knew about this. The South African scientists were very innovative and did not have to stand back to anyone.

His involvement in the war moved to the UK where he became part of the well-known “Blackett Circus”. These were groups of scientists, from various disciplines, who started working together to address problems, through a strong scientific approach to problem solving. The first problem they worked on was how to use and deploy radar in the most effective way against the enemy. Their assistance later extended to the generals in the field where they assisted in “research” to address “operational” problems. This was the start of operations research, as we know it today! This is great reading! A quote from the book about operations research and where it started is interesting: “*Quite who first conceived the concept of ‘operational research’ as a distinct*

scientific discipline with military applications is open to much conjecture. Certainly, Watson Watt claimed to have originated it and declared it to be one of his 'Three Steps to Victory' in his book by that name; the others were the cathode ray direction finder and radar. However, R V Jones in his *Reflections on Intelligence* gives credit to A P Rowe; Lord Zuckerman in *From Apes to Warlords* claims it to his pre-war dining club of the scientific elite – the 'Tots and Quots'; yet others would give the credit to Blackett". Schonland occupied various positions and later became the head of the "Army Operational Research Group". With the invasion at Normandy, he was asked to become the personal scientific advisor of Field Marshall Montgomery! When it was suggested to Montgomery that, "a small team of scientists observe his battles" he somewhat witheringly replied: "I observe my own battles"! Montgomery was a difficult guy and he chose an almost hermit-like existence for himself. Most contact with him was through Montgomery's Chief of Staff, Genl. de Guingand and since Schonland had a very good relationship with de Guingand he could make a significant contribution.

As the end of the war approached, different priorities needed to be addressed. The then Prime Minister of South Africa, Jan Smuts, wanted to establish a scientific organization in the country. He had a long relationship with the Schonland family and got to know Basil Schonland reasonably well during the war. He was thus the obvious candidate to establish the CSIR. This phase of Schonland's life is well described and it is very clear that he displayed enormous drive to get the organization off the ground. In this way he became the first president of the organization. However, he still had a great desire, and passion, to be involved in real research and negotiated an arrangement to spend one day a week at the BPI to continue his "lightning" research. Initially Schonland was going to stay at the CSIR for three years but, in the end, it was six years. On winning the elections in 1948, the new government of the National Party, requested Schonland to remain on in his position. One interesting fact is the involvement Schonland had with the South African military through the Corps of Scientists. One of their objectives was: "to assist the armed forces of the Union by means of warfare, offensive and defensive, and by the provision of an operational research group". That is the only reference to this Corps and it is not clear what happened to them, and in fact the "operational research group", in subsequent years.

After he left the CSIR he had many job offers and ultimately decided to join Harwell laboratory, first as deputy to the director and later he became director of Harwell himself. Harwell was the Nuclear Research Agency of the UK where research was conducted while it was also responsible for nuclear generated energy. Schonland had to deal with many highly controversial matters at Harwell. One example was an accident at one of the nuclear plants. This final phase of his life was possibly the pinnacle of his illustrious career. To become the head of Harwell was an exceptional achievement!

What makes this book so special? Every phase of his life is described in detail. The technical jargon is palatable and understandable. Schonland is portrayed as a highly gifted

physicist who became a very capable administrator. However, it is also clear that he remained in essence a researcher and scientist his whole life. In whatever environment he found himself he made an impact. Looking back it is unfortunate that Schonland and his wife decided to leave the country during the early fifties mainly because of the changing political climate. As strong liberalists, they could not associate themselves with the unfolding political situation. Schonland was seemingly strongly influenced by his wife. Nevertheless, this biography is an exceptional piece of work about one of South Africa's most able scientists. It reveals many aspects that were a total secret for many in the country. For Operations Researchers it gives an insight into the origins of this discipline and, for me, this was hugely interesting especially since a South African was involved. The biography is well researched, and the book a neat piece of work!

One of the listed benefits of being a student member of ORSSA, is that students may request that abbreviated versions of their CVs be published in the newsletter, if they have graduated and are about to enter the job market. Please contact the newsletter editor at ldtome@dip.sun.ac.za if you are a student who fits this profile and if you wish to have your CV published.

Curriculum Vitae: Laura Stockwell

I am currently seeking an OR-related position.

Personal Information:

Name: Laura Pamela Stockwell
Contact address: P.O. Box 2220
 Dennessig
 7601
Telephone: 072 245 1286
E-mail: flozz99@yahoo.com
Date of birth: 1981-01-28

Education:

2002	US	B.Sc. Honours in Applied Mathematics Awarded Cum Laude * Subjects including Methods of Operations Research, Mathematical Programming & Probability Models and Simulation.
2001	US	Bachelor of Science (B.Sc.) Major Subjects: Applied Mathematics (distinction) & Mathematics

Computer Skills:

Skilled in MATLAB, LaTeX and Microsoft Word, Excel and PowerPoint. I also have a small amount of experience with Mathematica and Visual Basic.

Referees:

1. Prof. J.M. de Villiers Department of Mathematics University of Stellenbosch Office: (021) 808 3283	2. Prof J.H. van Vuuren Department of Applied Mathematics University of Stellenbosch Office: (021) 808 4213
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CHAPTER NEWS

Johannesburg Chapter

Knowledge Engineering for Bayesian Networks

By Neil Manson

When I heard that one of the senior lecturers from Monash University in Australia would be visiting our campus in February, and that she would be presenting a seminar that might interest some of the members of ORSSA, I jumped at the opportunity. I emailed Ann, and asked her if she would be prepared to present her seminar to ORSSA, and her response gave me my first insight into her character. She was enthusiastic and willing, even though she didn't know ORSSA or me at all.

It turned out that Ann was visiting South Africa for the 100th Anniversary Rhodes Reunion that was held in Cape Town. While she was in South Africa, she decided to visit the newest campus of Monash University, here in Roodepoort. Thanks to her generosity, the Johannesburg chapter presented a seminar on Monday evening the 3rd of February entitled "Knowledge Engineering for Bayesian Networks". The seminar was held at Monash University South Africa in Roodepoort, and we are grateful to Monash SA for the venue and the refreshments provided.

Ann Nicholson is a Senior Lecturer in the School of Computer Science and Software Engineering at Monash University in Australia. She received her B.Sc. (Hons) and M.Sc. degrees in Computer Science from the University of Melbourne. In 1992 she received her Ph.D. in Engineering from the University of Oxford, where she was part of the Robotics Research Group. After 2 years as a post-doctoral research fellow in Computer Science at Brown University, she took up a position at Monash University in 1994. Her areas of research interest are reasoning under uncertainty, Bayesian networks, knowledge engineering, user modelling and plan recognition, stochastic planning and monitoring, and intelligent agents.

Ann began her seminar by introducing the concept of Bayesian Networks, describing what they are, and how they are applied to decision-making. She then went on to describe the major problem with the application of Bayesian Networks, which is getting appropriate information to describe the network, either from experts or from existing data. Ann discussed the use of knowledge elicitation from experts, and the use of automated knowledge discovery from data. She then demonstrated how these methods have been used in a number of case studies. One particularly interesting application was the use of Bayesian Networks to diagnose student misconceptions in their understanding of decimal numbers. In this case the network structure was built using a combination of expert elicitation and automated knowledge discovery. The Bayesian Network was then built into a game interface that allowed the students to play a number of games, during which their understanding of decimal numbers was diagnosed.

About 15 people attended the seminar, and Ann's presentation was very well received, as evidenced by the following comments:

- "It was interesting. She proved that OR/MS with the IT and

statistics is practically applicable." Brahm Bothma

- "A quick impression was that it although Ann's point of view, she was able to convey how it links up with other fields, such as Statistics and OR. The talk was quite practical, and she seemed to make it clear both what the current strengths are and what current problems may be." Renee Koen
- "An interesting and informative talk on a subject that should be of importance to a great number of operational researchers. I liked the practical examples (systems) where theory was put into practice." Hennie Kruger

Overall, a very successful seminar. Thanks Ann!

Western Cape Chapter

Studentekompetisie van die Wes-Kaap Tak

deur Jan van Vuuren

Die jaarlikse studentekompetisie van die Wes-Kaap tak van die Operasionele Navorsingsvereniging van Suid-Afrika het verlede jaar op Woensdag 13 November by die US Nagraadse Bestuurskool te Bellville plaasgevind. Die kompetisie bestaan jaarliks daaruit dat tersiêre inrigtings in die Wes-Kaap studente wat jaarprojekte in operasionele analise op honneurs- of verwante vlak doen, nomineer en hierdie studente dan kort mondelinge voorleggings oor hul projekte aan die Wes-Kaap tak voordra. Daar is gewoonlik drie kundige beoordelaars wat die mondelinge voordragte beoordeel, maar wat ook 'n insae het in die beoordeling van die kwaliteit van die studente se bypassende skriftelike verslae (wat hul normaalweg as deel van hul graadprogramme moes inlewer). Die wenner van die tak-kompetisie ontvang dan 'n kontantprys, sowel as 'n jaar se studente-lidmaatskap tot die Vereniging, en word ook deur die tak genomineer om aan die daaropvolgende jaar se nasionale studentekompetisie deel te neem.

Verlede jaar was daar "twee deelnemers". Die een deelnemer was Mnr Eldton de Waal (wat in 2002 ingeskryf was vir 'n honneurs in wiskundige statistiek by die Universiteit van Kaapstad) – sy projektitel was "*Portfolio Optimisation: Examining Resampling Efficiency and Portfolio Confidence Intervals.*" Die ander "deelnemer" het uit 'n span van vier studente bestaan, naamlik Amanuel Ghebretsadik, Chris Human, Debessay Kassa en Leo Tomé – almal honneurstudente in operasionele analise aan die Universiteit van Stellenbosch. Hulle projektitel was "*Determining Optimal Stock Re-order Levels at Clickabox Factory.*" Die drie beoordelaars, naamlik Prof Wim Gevers (US Nagraadse Bestuurskool), Prof Theo Stewart (Universiteit van Kaapstad) en Dr Esbeth van Dyk (WNNR) was dit eens al die deelnemers hul goed van hul taak gekwyd het, maar het besluit om Mnr de Waal van die Universiteit van Kaapstad as wenner aan te wys. Baie geluk aan hom!

Die studentekompetisie is voorafgegaan deur die algemene jaarvergadering van die tak, en die middag se gebeure is afgesluit met 'n heerlike vingerete-geselligheid wat deur die US se Nagraadse Bestuurskool voorgesit is.



Operations Research Society of South Africa
Operasionele Navorsingsvereniging van Suid-Afrika

What do you get from being a member of the Operations Research Society of South Africa?

FREE	The ORSSA Newsletter – this newsletter appears three times a year with lots of exciting information about OR and ORSSA activities, personalities, international news, book reviews, etc.
FREE	ORiON – the official journal of ORSSA, which has appeared annually for the past, almost, twenty years. It is dedicated to our members and you can use it to publish your work, see what fellow ORSSA members do, etc.
NETWORKING	ORSSA Chapters – there should be an ORSSA chapter in your region. During the chapter meetings and functions you can meet fellow OR practitioners and get to hear interesting talks.
NETWORKING	The annual national conference – this is an annual highlight of our society. The 2003 conference will be held in Pretoria.
MEMBERSHIP	Membership of various OR societies.
JOBS	Access to job opportunities – the society will assist anyone looking for a position in the OR field, by publishing an abbreviated CV.

For more information,

Phone +27 (021) 888 2614

or

e-mail fevandyk@csir.co.za

To join, fill in the form on the back of this page.

Want to join ORSSA? Fill in this Form.

Please complete the following form and print it out and fax to Mnr H Ittmann: +27-12 841 3037.

NOTE: Fields marked with a * may not be omitted.

Name *						
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Employer *						
Economic Sector						
Job Title						
Management Level						
Income Category						
Academic? (Y/N)						
Name in consultant database? (Y/N)						
Work Address *						
Work Postal Code *						
Work Country						
Work Experience (years)						
OR Experience (years)						
Qualifications *						
Degree Majors						
Professional Registrations *						
Professional Interests						
Medals/Awards						
Number of Publications						
Publications						
ORSSA Activities						
Membership Type *	Individual (R80 p.a.)		Corporate (R250 p.a.)		Student (R20 p.a.)	
Language Preference (English/Afrikaans)						



Operations Research Society of South Africa

FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2002

Dear Member

Enclosed you will find a copy of the ORSSA audited financial statements for 2001/02. For any professional organization it is important to be assured that its finances are handled on a sound basis. Even though these statements are a bit late, it is nevertheless with great pleasure that these statements are presented to you.

I would like to take this opportunity to thank the following people who made these statements possible:

- (i) Theo Stylianides, treasurer of ORSSA. Theo has been very meticulous in getting both the society's finances and membership database sorted out. This has been a huge task and we owe Theo our appreciation;
- (ii) The auditor, Elise de Beer, for her time, pro bono, in performing a detailed audit. On behalf of ORSSA, thank you;
- (iii) Gys Wessels for his assistance in getting the statements audited;
- (iv) You will notice that there are no comparative figures for the previous year. This is due mainly to problems encountered in the years prior to 2000/2001;
- (v) As noted by the auditor in her notes and as also discussed at the national conference at Goudini Spa, there will be a proposal to increase in membership fees in our next newsletter. This will then be discussed at the next AGM.

Regards,
Hans Ittmann
President, ORSSA

REPORT OF THE INDEPENDENT AUDITORS TO THE MEMBERS OF THE OPERATIONS RESEARCH SOCIETY OF SOUTH AFRICA

We have audited the annual financial statements of the Operations Research Society of South Africa. These financial statements are the responsibility of the society's executive committee. Our responsibility is to express an opinion on these financial statements based on our audit.

Scope

Except as discussed in the following paragraph, we conducted our audit in accordance with statements of South African Auditing Standards. Those standards require that we plan and perform the

audit to obtain reasonable assurance that the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

Qualification

The Operations Research Society of South Africa's previous financial statements and audit report were for the year ended 30 June 1997. No records for the transactions between the period of the previous audit and 30 June 2001 were available. Accordingly, it was not possible to verify the opening balances as at 1 July 2001.

In common with similar organisations, it is not feasible for the society to institute accounting controls over cash collections from donations or membership fees prior to initial entry of the collections in the accounting records. Accordingly, it was impracticable for us to extend our examination beyond the receipts actually recorded.

Qualified audit opinion

In our opinion, except for the effect on the financial statements of the matters referred to in the preceding paragraph, the financial statements fairly present, in all material respects, the financial position of the society at 30 June 2002 and the results of its operations for the year then ended in accordance with generally accepted accounting practice.

Going concern

Without further qualifying our opinion, we draw attention to the fact that the society would have incurred a nett loss if the ICORD account transfer did not take place during the year ended 30 June 2002 and, the fact that membership fees have not increased over the past 10 years, although newsletter and journal production costs have increased. These conditions could indicate the existence of material uncertainty which may cast significant doubt about the society's ability to continue as a going concern in future, should attention not be given to increasing membership fees or finding alternative sustainable sources of income to fund operations.

*De Beer Accountants and Auditors
Registered Accountants and Auditors
Chartered Accountants (SA)*

Income Statement for the period 1 July 2001 to 30 June 2002

	Notes	R
Income	1	44 917.83
Subscription Fees	2	8 501.83
ORION (Foreign subscriptions)		2 064.42
Advertisements		200.00
ICORD account transfer		22 948.05
ORSSA 2001 (50% profit)		4 746.50
ORSSA 2001 Conference fees and sponsorships		2 500.00
Interest received		3 957.03
Expenditure		36 395.08
Newsletters and journal production		10 890.77
Medals and gifts		861.80
Student competition prizes		3 500.00
Bank charges		792.51
Accounting fees		750.00
Bad debts written off		15 325.00
IFORS subscription fee		1 875.00
EURO subscription fee		2 400.00
NETT INCOME		8 522.75

Balance Sheet as at 30 June 2002

	Notes	R
CAPITAL EMPLOYED		
GENERAL FUNDS		
Balance 1 July 2001		77 879.97
Nett income 1 July 2001 – 30 June 2002		8 522.75
		86 402.72
EMPLOYMENT OF CAPITAL		
Investments	3	56 964.46
Nedbank Investment Account		55 538.58
Absa Term Deposit		1 425.88
Current Assets		44 062.20
Bank		37 507.2
Membership fees due 2000/1		2 197.00
Membership fees due 2001/2		4 358.00
Current Liabilities		14 623.94
EURO Subscription		2 400.00
K. Koch membership		600.00
Membership fees due to Chapters		2 833.94
IFORS Subscription for 4 years		7 500.00
Membership fees received in advance 2002/3		1 290.00
		86 402.72

Operations Research Society of South Africa

Notes to the Annual Financial Statements for the year ended 30 June 2002

1. Accounting basis

The financial statements are prepared on the historical cost basis. The following are the principal accounting policies used by the society which are consistent with previous years.

These statements comply with the statements of Generally Accepted Accounting Practice.

2. Revenue recognition

Membership fees are recorded in the financial statements on the date that membership fees become due.

3. Investments

Investments are carried at costs, except where there is a permanent decline in value in which case they are written down.

4. Taxation

No taxation has been made as the society is deemed exempt from tax.

5. Comparative figures

No comparative figures were available.

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CHAPTER CALANDER

Vaaldriehoek Chapter

Wednesday 23 April 2003, at Sasol, Sasolburg

Spreadsheet-based OR: Trojan Horse or Achilles Heel
By Paul Kruger

May/June 2003, at Sasol, Sasolburg

Stochastic modelling in a preto-chemical industry
By Marlize Meyer

July/August 2003, at Sasol, Sasolburg

OR approach/OR thinking
By Dries de Wet

October/November 2003, at Sasol, Sasolburg

Year end function

Western Cape Chapter

by Jan van Vuuren, vuuren@sun.ac.za

Lots of exciting events are planned as part of the activities of the Western Cape Chapter of ORSSA during the 2003 calendar year. These activities comprise four regular style seminars, possibly a half-day workshop and of course the annual student competition of the Chapter. Please mark the following seminar dates in your diary:

1. **Wednesday March 12th, 2003 at 16:00**
Speaker: Juwa Nyirenda (Department of Statistical Sciences, UCT)
Topic: *A slice and squeeze algorithm for solving mixed integer programming problems**
Venue: Room 2.23, P D Hahn Building, North (Building 28), UCT
2. **Wednesday April 16th, 2003 at 16:00**
Speakers: Esbeth van Dyk (CSIR) & Frank Ortmann (Stellenbosch University)
Topic: *Modelling infrastructure capacity for the SA fruit industry**
Venue: Room A409, Main Engineering Building, Banghoek Road, Stellenbosch
3. **Wednesday May 28th, 2002 at 16:00**
Speaker: Simon Trupp (PIC Solutions)
Topics: *Predictive Modelling used in Credit Risk**
Venue: Room 2.23, P D Hahn Building, North (Building 28), UCT

4. Wednesday October 1st, 2003 at 16:00

Speaker: Theo Stewart

Topic: *A genetic algorithm approach to multi-objective land use planning**

Venue: Room A409, Main Engineering Building, Banghoek Road, Stellenbosch

In addition to the above mentioned seminars a half-day workshop is also on the table, probably late in August or early in September, depending on the date of the national conference. Trevor Wegner (Department of Statistical Sciences, UCT) has indicated that a hands-on workshop on *data mining* may be a good option. However, if there are any other suggestions as to a suitable topic that chapter members would like to bring to the attention of the chapter executive, please email Jan van Vuuren at the above address, and watch this space in the next newsletter for further information on the workshop. Finally, the annual chapter student competition will take place in November, and will be combined with the annual chapter AGM and cocktail party, as usual. The details are as follows:

5. Wednesday November 12th, 2003 at 16:00

Speakers: Students on honours level (or equivalent), nominated by a Tertiary Institution

Topic: *Student Competition on OR year projects completed in 2003*

Venue: Room 102, Van der Horst Building, Stellenbosch Business School, Bellville

If you have a graduate student, whose year project may be classified as in the broad field of OR, whom you would like to nominate for the competition, please do so via email by providing Isabelle Nieuwoudt at isabelle@sun.ac.za with the name, affiliation, project title, project abstract and a copy of the written report by October 31st, 2003. The annual competition prize consists of a cash award, a year's free student membership to ORSSA and an official chapter nomination to the national student competition during the subsequent year.

If you have any enquiries about Western Cape Chapter activities, or would like to contribute to or comment on activities for 2003, please contact Jan van Vuuren (chapter chair) at the email address provided above.

NATIONAL CONFERENCE 2003 NASIONALE KONFERENSIE 2003

**The Pretoria Chapter, as the host of the 2003
ORSSA National Conference, has provisionally
decided on the following dates:**

**Sunday 7 September to Thursday 11
September,
with the Thursday a day for site visits.**



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