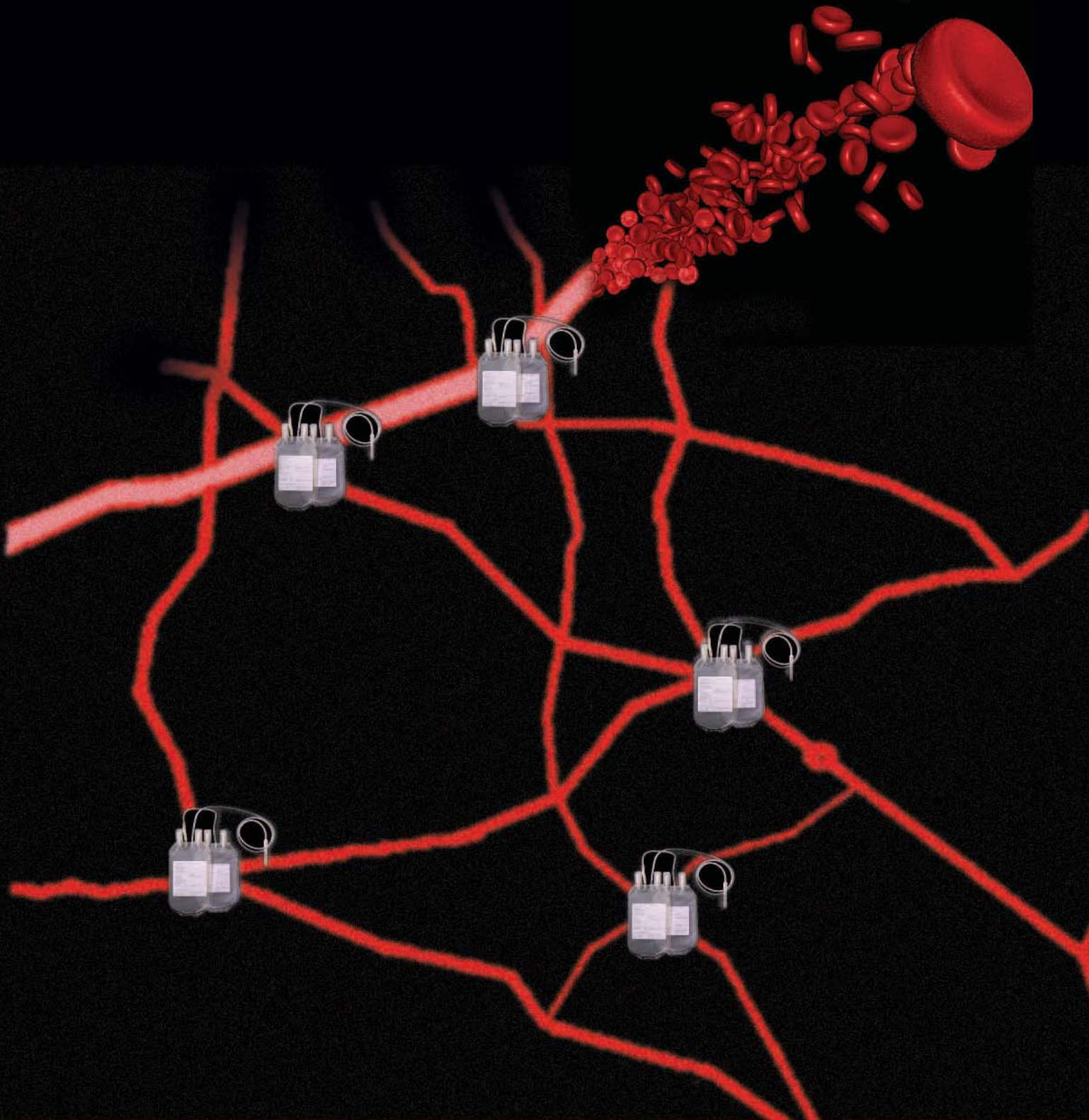




# Newsletter

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



December 2005



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## FROM THE PRESIDENT'S DESK

By Wim Gevers ([wg@sun.ac.za](mailto:wg@sun.ac.za))

ORSSA President



**Wim Gevers**

Very recently I received the latest copy of OR/MS Today, the newsletter of Informs. This was the edition prior to their annual conference which was to have been held in New Orleans and due to the devastation created by Katrina, had been relocated to San Francisco. In his presidential article Richard Lawson asks how well we are prepared to handle natural disasters and challenges the OR fraternity to contribute to the establishment of realistic and

comprehensive plans to deal with emergencies. Although this challenge was put to the Informs membership, it is also a question with which we can associate.

South Africa also has had its fair share of natural disasters, albeit not to the extent of Katrina. But we know floods and drought. And it seems as if climatic patterns are changing, bringing with it rainfall that seems to be more intense over shorter periods, which brings all the problems of flooding and loss of valuable arable land as well as the water itself in our relatively dry country. If climatic changes persist, this problem may become more severe in the future.

Not only do we know natural disasters, but we also know the man-made ones: fires that ravage townships with consequential loss of life and property; un-roadworthy buses that transport innocent passengers into devastating accidents; irresponsible drivers of any kind of vehicle that take the lives of fellow users of the highways into their hands by irresponsible driving; lawlessness leading to so much human grief due to murder and rape. Of late we have also experienced major electricity failures in Gauteng and Cape Town with the consequential inconvenience and damages. A local newspaper even asked its headline "What is wrong at Koeberg?" Would we be in a position to handle a nuclear disaster?

I do not want to sound alarmist, but it takes a disaster like that caused by Katrina to make us wake up. Often the wake up call comes too late – because we can easily be complacent and say that we do not have hurricanes like Katrina. Yet it is a call to policy makers to ensure that effective emergency plans are in place and can be executed effectively. And it is here where we as OR specialists can certainly assist the policymakers to design comprehensive emergency strategies.

When I took over as president of ORSSA in 2003, I stressed the importance of people and recognition of people in my first contribution to this column. As I come to the end of term as president, I again want to reflect on people. When I look back on my term as president, much has been achieved: our annual conferences have become bigger and better, we have cooperated with the SAIIE for the first time in many years; ORiON is up to date and in its new jacket a flagship of the

society; a quality newsletter appears quarterly; we have won the bid to present IFORS 2008; the student competition has been expanded thanks to continued and increased support from SAS. All of this would not have been possible if it had not been for a committee that dedicates a lot of voluntary time to the cause of Operations Research in South Africa. I thank you all for your contribution, often at great personal sacrifice. You have made my presidency something to treasure.

In particular I want to thank one executive member who will be vacating her position at the end of the year: our secretary Esbeth van Dyk. Esbeth has been doing a sterling job as secretary of the society for many years, ensuring that the administration runs smoothly. Thank you for your dedication and unwavering support for ORSSA and its activities. You have earned a well deserved rest from these chargs. Isabelle Nieuwoudt will join the executive as secretary in the New Year. Isabelle has served on the executive in the past and we look forward to her contribution.

In the New Year Marthi Harmse will also take over the presidency of the society. On behalf of the society, I wish you good luck with your term of office. May ORSSA continue to grow under your leadership.

I also hope that the coming festive season will bring some opportunity for rest amongst our members. May you all experience peace and goodwill and be invigorated for the challenges of 2006. ♦

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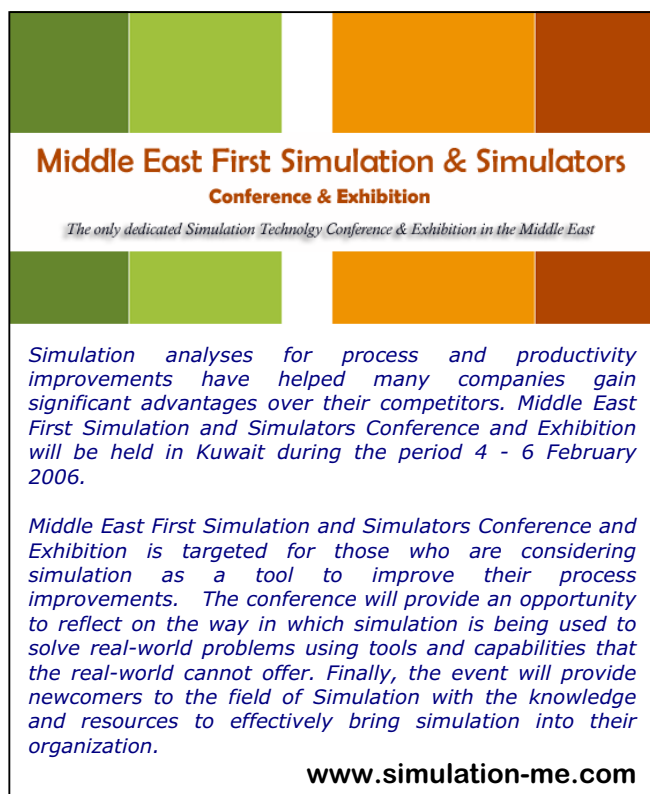
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## FROM THE EDITOR



Cobus Potgieter

In the main article of this issue, Jeanne le Roux writes about the strategic location decisions in blood bank systems. She explains the relevance of such decisions to the SANBS (South African National Blood Service) and discusses ways of modeling the different aspects involved. Finally she enlightens us about the research she has done in this regard.

In the previous issue, Dave Evans mentioned the first four fellowships that were awarded at the annual conference this year and promised that the December issue of the Newsletter will contain citations on the first four fellows of ORSSA. The promised citations of Paul Fatti, Giel Hattingh, Hans Ittmann and Theo Stewart are included in this issue.

The winner of the Tom Rozwadowski Medal was also announced in the previous issue. Now Paul Fatti reveals the selection committee and explains the multi-criteria approach that was followed to determine this year's winner. I also want to congratulate Esbeth and Emma on this prestigious award.

Like most members, I also had a very busy year, full of hard work and little time to rest, but I have learned a lot about ORSSA, Operations Research and myself. I found that nothing of worth is gained without sacrifice. In order to find balance in life, you sometimes have to give up certain things. And this is where OR skills can be used to manage one's own life, *i.e.* management of your time and setting goals. Pushing yourself to the limit will have a bad effect on all your work in the long run.

It has been a year since my first issue of the Newsletter appeared and I would like to thank everyone who supported me during the past year. Also a special thanks to all members who took some time from their busy schedules to contribute to the newsletter. I hope that everyone will have an enjoyable holiday and a relaxing festive season.

Until next year,  
 Cobus

## ODYSSEUS 2006

Altea (Alicante), Spain, May 23-26

### Third International Workshop on Freight Transportation and Logistics

This workshop, as the two previous ones held in Crete (2000) and Sicily (2003), is devoted to models, algorithms, strategies, and software systems which enable decision support in freight transportation and logistics.

[www.uv.es/odysseus2006/](http://www.uv.es/odysseus2006/)

## MEMBER PROFILE: MARTHI HARMSE

By Cobus Potgieter (*pottie@dip.sun.ac.za*)



**Marthi Harmse**

Marthi Harmse was born in Bloemfontein forty years ago. She matriculated in Bloemfontein and went on to study at the University of Stellenbosch. She obtained a BSc, BSc (Hons) and MSc before she started her career as a Mathematics teacher in Vanderbijlpark.

Marthi's first permanent employment was with the Department of Computer Systems at the Vaal Triangle Technikon. After almost two years she resigned to accompany her husband on an overseas development programme in Houston (Texas). There she worked (without being paid or paying taxes) as an aerobics instructor. On their return, she joined the Vaal Triangle Technikon again – this time as lecturer in the Department of Information Technology. After another six years she became Head of the Department of Curriculum Development with her main responsibility to facilitate the implementation of Outcomes Based Education institution wide.

Almost four years ago Marthi joined Sasol Technology – where she still is today – leading the Optimisation Group within the Modelling Development and Application Services team. The first project she worked on after she joined Sasol Technology was a project to implement an Advanced Planning and Scheduling system for business units in Sasol Polymers. Since then Marthi has been involved in many other projects where she mainly utilised mixed integer non-linear programming and very often developed scheduling models. She also performed data analysis, developed decision trees, developed system diagrams and managed various projects. Currently she is helping to develop models to optimise the Coal Value Chain from Sasol Mining to Sasol Synfuels.

Marthi joined the Vaal-Triangle chapter of ORSSA ten years ago. Since then she served on the Executive Committee as Additional Member for two years and as Vice-President for one year, organised the annual ORSSA conference twice, and served as Vaal Triangle Chapter chairperson for four years.

### Where did you study and how did this prepare you for a career in OR?

I wanted to go to the University of Cape Town even before I started primary school (both my parents are alumni of this university). In the end I went to the University of Stellenbosch – with only a vague idea of what I wanted to study or the career I wanted to follow. While the first year students had their own orientation programme on their first day at the university, my parents had the opportunity to visit various departments. My mother said her goodbyes, asking me to let them know what I decided to study. She did mention that she was impressed with the Department of Applied Mathematics. So I ended up completing a Bachelors in Science with majors in Applied Mathematics, Mathematical Statistics and Computer Science.

During my undergraduate years I became aware of a career in Operations Research and was interested in postgraduate studies in this field – hence my choice of final year subjects. I only learned at a later stage that it apparently runs in the family – my father's nephew, Gerhard Joubert, was well known in the Operations Research community. I completed my Honnours degree in Operational Analysis and planned to continue with a Masters degree while working as an Operations Researcher in Cape Town. However, I continued my fulltime studies and completed a Masters degree in Computer Science.

In the meanwhile I was married and moved with my husband to Sasolburg. I started lecturing in the Department of Computer Systems at the Vaal Triangle Technikon. I did a bit of Electrical Engineering to better equip myself for my lecturing, but eventually continued my studies in Operations Research. I completed a Masters degree in Operations Research at the University of Potchefstroom for Christian Higher Education, but not before I completed my undergraduate studies in Philosophy at the University of South Africa.

In retrospect I believe that Operations Research is an interdisciplinary field where one makes a contribution in a team with diverse backgrounds and interests. I also believe that Operations Research is a metadiscipline where Philosophy could be applied in practice. I am grateful for my unplanned preparation up to this point in time for a career in Operations Research.

### Sasol is a company with one of the largest OR departments in South Africa.

- What are the main OR-related areas focused on within Sasol?
- What OR-techniques are most often used?

I am honoured to work at Sasol, a company founded by South Africans some fifty years ago, and now a global role player in the petro-chemical industry. The team I am playing in – the Modelling Development and Application Services team which forms part of the Operations Profitability Improvement group – focuses on Decision Support for the whole of Sasol on an ad hoc basis as well as models used in operational, tactical and strategic decision making. Other groups in Sasol focus more on Industrial Statistics, Project Management, Supply Chain Optimisation, Logistics, Business Process Optimisation, Cost Reduction, Information Management, Knowledge Management, Strategic Planning, Scenario Testing, Systems Diagrams, etc. Like most other companies I believe that many departments in Sasol practice Operations Research but by another name.

As explained above, many Operations Techniques are used throughout Sasol. The Modelling Development and Application Services team is organised into four groups: Optimisation, Stochastic Modelling, Advanced Process Modelling, and Integration. Typically we integrate linear programming (which usually entails mixed integer non-linear programming), discrete point simulation, and chemical process simulation. It is, however, not a case of plug-and-play: we might use any other technique to perform the required decision support.

**How often does Sasol recruit OR-related personnel?**

As mentioned before, I believe that Operations Research is an interdisciplinary field where one makes a contribution in a team with diverse backgrounds and interests. Like most companies, Sasol typically recruits personnel for its core business, i.e. (on a higher education level) Chemists and Chemical Engineers, some other engineers such as Mechanical Engineers and Industrial Engineers, and occasionally other staff. All of these groups might include Operations Research related personnel (e.g. a Chemical Engineer with a postgraduate qualification in Operations Research).

**What do you view as the strengths and weaknesses of ORSSA?**

I find that often a weakness is simply the other side of a strength. The diversity of ORSSA is often what attracts people to this society, but it could also cause lack of identity. The society extends more than thirty years of existence because people continually serve it on a voluntary basis, but a lack of voluntarism might dramatically change the character of the society. The warm and friendly fellowship experienced in the society attracts people to join (for life), but could also be regarded as a lack of professionalism which is often characterised by formality and competitiveness.

**What is your vision as president of ORSSA and what do you aim to achieve in your two years of office?**

My visions are coloured by the idea that there is nothing new on earth. It would be a great privilege for me to carry on the good work established by so many role models before me. I am passionate about learning. I know that this will be a good opportunity for me and hope that some others can learn with me. Another passion is sustainability and I hope that I can contribute in some small way to the sustainability of the society. Maybe because I had the opportunity to get involved in the lives of young people before, I will be honoured if I could inspire at least one person to start doing Operations Research. And of course there is IFORS 2008 ahead of us! I am fortunate to play in an amazing team. In all of this I am fully dependant on my Heavenly Father.

**What is your message to young aspiring OR practitioners?**

As said before, I believe that Operations Research is an interdisciplinary field where one makes a contribution in a team with diverse backgrounds and interests. Learn to be an excellent team player by not being exclusive, but inclusive. I also believe that in Operations Research one should support decision making in a systematic and systemic way. Develop both competencies continuously. Do not wait for the perfect opportunity – start doing and start creating opportunities. Do not focus only on the big employers – start helping those around you. Build the track record of your life by diligently documenting everything you are doing. Keep a learning log (for example, what happened, what did I do and what was the outcome). Join ORSSA! ♦

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# Strategiese liggingsbesluite in bloeddienstelsels

By Jeanne le Roux ([lrouxj@unisa.ac.za](mailto:lrouxj@unisa.ac.za))  
Departement Besluitkunde, UNISA

## Strategiese besluite

Logistieke besluite oor die aantal, ligging en kapasiteit van fasiliteite in 'n vraagvoorsieningsketting word volgens Simchi-Levi, Chen en Bramel [9] geklassifiseer as op strategiese vlak. Sulke besluite het 'n langtermyn effek. Op taktiese vlak word besluite elke week, maand of kwartaal opdateer, soos in voorraadhouding en vervoer. Die operasionele vlak behels dag-tot-dag besluite, soos in die skedulering en roetering van voertuie.

## 'n Bloeddienstelsel

Die Suid-Afrikaanse Nasionale Bloeddienst (SANBS) het in 2001 ontstaan toe sewe bloedoortappingsdienste in Suid-Afrika moes saamsmelt om een nuwe nasionale diens te vorm. Die Westelike Provinsie Bloedoortappingsdiens funksioneer nog onafhanklik van die SANBS.

Bloedoortappingsdienste vervul twee funksies, naamlik die insameling en uitreiking van bloed. Die SANBS het 'n topbestuursafdeling vir bloedinsamelings en een vir die verwerking, toetsing en uitreiking van bloed. Bloed word by vaste skenkersentrums en satelliete in streektakke ingesamel. Mobiele klinieke vir insamelings word vanaf takke gereël. Ingesamelde bloed word na prosesseersentra vervoer, waar dit getoets en verwerk word. Veilige bloed word vanaf die prosesseersentra na bloedbanke gestuur vir voorraadhouding. Wanneer 'n pasiënt by 'n hospitaal 'n bloedoortapping benodig, word gekruistoetsde bloed by 'n bloedbank afgehaal.

Bloed is 'n bederfbare produk en moet daarom deurgaans koud gehou word in die vervoerketting. Dit noodsaak deeglike logistiese beplanning, soos voertuigskedulering en kortste-roete-bepalings.

Verskeie bloedkomponente verval binne ure ná skenking. Bloed word omskep in verskillende bloedprodukte volgens die tyd wat verloop tussen insameling en verwerking. Bloed kan as heelbloed gestoor word as dit binne drie uur ná insameling verwerk word. Rooibloedselkonsentrate en bloedplaatjiekonsentrate word verkry uit heelbloed waaruit die plasma verwyder is deur sentrifugering. Om voldoende voorraad van ander bloedprodukte, soos vars bevrore plasma, te verseker, moet bloed binne ses tot twaalf uur ná skenking in komponente geskei word. Anders word dit aan die Nasionale Bioprodukte Instituut verkoop, wat ander bloedprodukte daaruit maak.

Diensleweringvlakke by bloedbanke word geraak deur buffervlakke vir voorraadhouding. Op sy minste bestaan 'n bloedbank uit 'n yskas, waar een kundige persoon benodig

word om die bloed te kruistoets en uit te reik. Heelbloed het 'n rakleefyd van 45 dae, terwyl rooibloedselkonsentrate se rakleefyd 35 dae is. Bloedplaatjiekonsentrate mag vir 5 dae gestoor word, maar plasma kan vir tot 2 jaar gestoor word.

Gespesialiseerde toerusting, soos 'n sentrifuge, word by elke prosesseersentrum benodig om bloed te verwerk. Een persoon kan 24 eenhede bloed per uur verwerk en beset sekere toerusting uitsluitlik daarvoor. Die kapasiteit van die prosesseersentra beperk dus die tempo waarteen bloed verwerk kan word. Dit kan lei tot wagtyd in 'n tou vir bloedeenhede om verwerk te word. Die aantal eenhede bloed wat per dag ingesamel word en die tempo waarteen dit by 'n prosesseersentrum afgelewer word, het dus 'n koste-implikasie.

## Ligging en toewysing van fasiliteite

Die ligging van prosesseersentra ten opsigte van insamelings- en uitreikingspunte raak die vervoerkostes en voorraad bruikbare bloed.

Die samesmelting van voorheen onafhanklike bloeddienstelsels in Suid-Afrika noodsaak nuwe operasionele, taktiese en strategiese besluite.

Ou provinsiale grense geld nou nie meer in die nuwe bloeddienst nie. So kan bloed wat in Kwa-Zulu Natal ingesamel word en voorheen na 'n prosesseersentrum in daardie selfde provinsie gestuur is, nou eerder na 'n nader prosesseersentrum in byvoorbeeld die Vrystaat gestuur word vir verwerking, as dit meer koste-effektief is. In die nuwe stelsel kan toewysing van insamelingspunte aan prosesseersentra dus heroorweeg word.



Topbestuur oorweeg dit om die aantal prosesseersentra te verminder. Hulle wil kundigheid en duur toerusting op minder plekke konsentreer. Indien die huidige aantal prosesseersentra van sewentien na sewe verminder word, is daar 19448 kombinasies van moontlike liggings om te oorweeg. Die ligging en kapasiteit van elke prosesseersentrum is dus 'n strategiese beslissingsveranderlike.

Weens HIV en VIGS mag die skenkerbevolking se geografiese ligging, profiele en getalle oor tyd drasties verander. Nuwe insamelingspunte sal dan geïdentifiseer moet word. 'n Strategiese bestuursbesluit sal dan die ligging en kapasiteit van (nog) 'n prosesseersentrum wees om hierdie insamelingspunte te dek.

### Voertuigskedulering en simulاسie

Die nasionale voorraadbestuurer van SANBS eksperimenteer tans met vervoerhoeveelhede, roetes en skedulerings vir insamelingsvoertuie, ten einde tyd tussen donasie en prosessering te verminder. Simulasie kan nuttig wees om sulke eksperimente te modelleer.

### Wiskundige modellering en optimering

Antwoorde op die volgende twee vrae oor die ligging van prosesseersentra behoort nuttig te wees vir SANBS se strategiese besluitneming:

Waar moet die prosesseersentra geleë wees

- (1) sodat totale reisafstande tussen die insamelingspunte en prosesseersentra, en tussen bloedbanke en prosesseersentra, geminimeer word; en
- (2) sodat die totale jaarlikse aantal eenhede bloed wat binne drie uur ná donasie by 'n prosesseersentrum afgelewer word, gemaksimeer word?

Hierdie twee probleme saam vorm 'n heeltallige meerdoelwitprogrammeringsprobleem.

### Mediaan- en senterprobleme

Liggingsbesluitnemingsprobleme kan as heeltallige programmeringsprobleme geformuleer word, byvoorbeeld as 'n p-mediaan- of 'n p-senterprobleem. Voorbeelde van formulering, gevallestudies en oplossingsmetodes kom volop in die literatuur voor, soos in die oorsigte deur Labbé, Peeters en Thisse [5], Owen en Daskin [7] en Revelle en Eiselt [10].

Die kompleksiteit van die p-mediaanprobleem is NP-moeilik [4]. Vir netwerke met baie nodusse moet heuristieke metodes dus gebruik word om oplossings te kry. O'Connell [8] beskryf duaalgebaseerde algoritmes, en Alp, Erkut en Drezner [1] 'n genetiese algoritme.

### Navorsingsprojek

My belangstelling in die bloeddienste het in 1980 ontstaan toe ek vir my MSc in Toegepaste Wiskunde aan Universiteit van Stellenbosch 'n skripsie met die titel "Die optimale ligging van

bloedbanke" onder Prof Gerhard Geldenhuys se leiding voltooi het [6]. In 'n gevallestudie vir die destydse Oostelike Provinsie Bloedtoetappingsdiens is p-mediane vir skenker- en uitreikingsdata verkry [2]. Om oplossings te kon kry, het ek 'n vertak-en-begrens algoritme [3] in GPSS, 'n simulasietaal, geprogrammeer.

Koste-implikasies van strategiese liggingsbesluite in bloeddienstelsels vorm die kern van my huidige navorsingsprojek, waarvoor ek in 2004 by die Universiteit van Stellenbosch se Departement Toegepaste Wiskunde vir 'n PhD in Operasionele Analise geregistreer het, met Prof Jan van Vuuren as studieleier. Met die wiskundige modellering van die SANBS se liggingsprobleme hoop ek om bruikbare en sinvolle resultate te kan lewer.

Hierdie navorsingsprojek word finansiëel ondersteun deur die Thuthuka Program van die National Research Foundation (NRF).

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## BI HELPS CORRECTIONAL SERVICES MEET REHABILITATION MANDATE

*Many correctional services departments provide education, skills or alcohol/drug treatment programmes to improve efficiencies and prisoner success rates. Their effectiveness, however, is often questioned.*

In the USA, the Oregon Department of Corrections (ODOC) is addressing those questions with the help of SAS, leaders in business intelligence.

"There is pressure to prove our programmes are effective," explains Laura Buring, ODOC analyst. During a recent legislative session, \$20 million in funding for correctional programmes was restored only after agreement to provide performance measures.

The department implemented a system using SAS for data warehousing and analysis.

"Institutional programmes are expensive. With SAS, we can see which ones are working. Our goal is to break the cycle of criminality - we're using SAS to evaluate our success."

Prison managers need to combine offender and programme information with fiscal, departmental and HR data. Buring and fellow analyst Don Pack are using SAS to build a data warehouse to streamline information management and enable knowledge sharing throughout the state corrections system.

"With SAS, we can monitor corrections programmes using any success criteria, and officials can use the results to really understand what's going on," says Pack.

Officials advocate a unique corrections plan for every inmate. Tracking the overall success of the plans involves complicated analyses of multiple programmes alongside data on thousands of inmates – a mountain of information in different state databases. SAS accesses data from anywhere, bringing it into one cohesive system.

The department has seen huge benefits from SAS's analytic power, including productivity gains above 25 percent for its Research and Evaluation unit.

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# NEW FELLOW OF ORSSA: L PAUL FATTI

By Esbeth van Dyk (fevandyk@csir.co.za)



**“Teaching has kept me in touch with the basis of our profession, while research has helped me keep abreast on some of the modern developments.”**

**Paul Fatti**

*Citation.* Libero Paul Fatti was born in Uxbridge, England on January 28<sup>th</sup>, 1944. After matriculating with a first class from St Johns College in Johannesburg in 1961, he studied at the University of the Witwatersrand where he obtained a BSc (Mathematics and Mathematical Statistics) in 1964 and a BSc Hons (Mathematical Statistics) in 1967. In 1968 he obtained his MSc DIC (Statistics and Operations Research) from Imperial College, London and in 1979 his PhD from the University of the Witwatersrand. The topic of his dissertation was “The random effects model in discriminant analysis.”

Paul Fatti was employed by the Statistics Division of the Chamber of Mines Research Laboratories while he studied towards his Honours degree. After obtaining his Masters degree he worked as consultant for the Institute of Operational Research in London. In 1970 he returned to South Africa and joined the Department of Applied Mathematics at the University of the Witwatersrand as lecturer. He later acted as

Head of the Division of Statistics and designed the honours programme in Operations Research. From 1981 to 1986 he worked at the National Research Institute for Mathematical Sciences of the CSIR where he headed the Division of Operations Research and Statistics from 1984 to 1986. In 1987 he returned to the University of the Witwatersrand as Head of the Department of Statistics and Actuarial Science until he retired in 2004. Throughout his career he consulted for numerous companies. He is currently Emeritus Professor and Honorary Research Professor at the School of Statistics and Actuarial Science and the Dental Research Institute of the University of the Witwatersrand.

During his academic career he has co-authored a book, contributed a chapter to a book, published 91 peer-reviewed papers; for one of which he received both the Tom Rozwadowski medal (1981) and the Goodeve Medal (1984). He has also reviewed papers for 19 journals and has presented papers at 22 international and numerous local conferences. In addition, he has supervised 10 PhD and 15 Masters students to completion.

Paul has been a member of ORSSA for many years. In addition to serving on various committees and panels, he has served as Chairman of the Johannesburg Chapter (1979-1980), President (1983-1984), Editor of ORiON (1997-2004) and ORSSA representative on IFORS (since 1993). Paul is also a fellow of the Royal Statistical Society and a member of INFORMS and SASA, of which he was president in 1988.

For his contribution to the Operations Research profession in general and in particular at the University of the Witwatersrand and ORSSA over many years, he was duly and unanimously elected Fellow of the Operations Research Society of South Africa in August 2005.

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# NEW FELLOW OF ORSSA: GIEL HATTINGH

By Marthi Harmse (marthi.harmse@sasol.com)



**“Most problems can be thought of as the realisation that you have a goal or goals where you cannot achieve infinite satisfaction. OR is the science where you model these objectives and constraints first before you solve the problem.”**

**Giel Hattingh**

*Citation.* Johannes Michiel Hattingh was born in Parys in the then Orange Free State of the Republic of South Africa on 16 May 1940. Fifteen years later Giel matriculated in the same town. Crossing the Vaal River he enrolled for the BSc degree with majors in Mathematics and Statistics at the then Potchefstroom University for Christian Higher Education, which he obtained *cum laude* in 1962. A year later he completed the degree Honns BSc (Mathematics), two years later the degree MSc (Statistics) and in 1971 Giel obtained the degree DSc (Statistics and Operations Research), all at the same university on the banks of the Mooi River.

At a young age Giel started working as a technical clerk at SASOL (1957–1960). After obtaining his MSc degree, he started lecturing at his alma mater in 1966. Three years later

Giel was promoted to senior lecturer and in 1976 he became professor. From 1981 to 1984 Giel was the Director of Computer Services and from 1985 to 1989 the Chief Director of Planning and Information. In 1990 Giel became Professor and Chairman of Computer Science and Information Systems. In 1998 he was appointed Professor of Computer Science and Head of the TELKOM Centre of Excellence, as well as the Head of the Research Subprogramme on Computer Science, Informatics and Operations Research in the Focus Area on Business Mathematics and Informatics – positions he still holds.

Giel has been a member of ORSSA for many years. He is also a full member of the South African Computer Scientists and Information Technologists Society, of which he was President in 1997 and 1998. Giel was advisor for many PhD as well as Masters candidates in Statistics and Operations Research, Computer Science and Information Systems as well as from the Business School. He has published extensively, especially in the fields of Decision Support Systems, Mathematical Programming and Artificial Intelligence. He is involved in collaborative research with partners in Germany and the United States of America. Giel completed post doctoral courses, went on various study tours, attended many conferences and was keynote speaker at various occasions both locally and overseas. He co-authored three papers at IFORS 2002 and again at IFORS 2005.

Over a considerable period of time Giel has served the field of Operations Research, particularly at the Potchefstroom University for Christian Higher Education, now the North-West University. He was therefore duly and unanimously elected as Fellow of the Operations Research Society of South Africa in August 2005.

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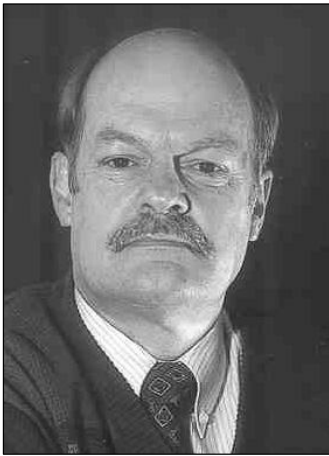
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# NEW FELLOW OF ORSSA: HANS WITTMANN

By Jan van Vuuren (vuuren@sun.ac.za)



**“I can confidently say there are many, many complex problems out there in the real world that we as OR people can address. The challenge is to go out there, find them, solve them and support proper scientific decision making in the process.”**

**Hans Ittmann**


*Citation.* Hans Willem Ittmann was born in Vrede (in the then Orange Free State of the Republic of South Africa) on June 9th, 1949. After matriculating with two distinctions from Solomon Senekal High School in 1966, he enrolled for the degree BMil (BSc) at the University of Stellenbosch – a qualification he obtained in 1970, whilst simultaneously qualifying as a pilot in the South African Air Force in 1968. He also obtained the degrees BSc(Hons) and MSc (both majoring in Operations Research) from the University of South Africa in 1977 and 1981 respectively. His MSc thesis topic was on a linear programming model for the South African Purse-Seine fishing industry. Finally, he obtained an MBA from the University of Pretoria in 1985 with a thesis on the scope and impact of decision support systems on organizations, for which he received the Old Mutual Gold Medal for the best MBA student.

From 1970 to 1973 Hans Ittmann was a lieutenant in the South African Air Force, serving as pilot at the Waterkloof and

Swartkop Air Force Bases in 1972 and 1973. In 1973 he joined the National Research Institute for Mathematical Sciences at the CSIR, as Chief Specialist Researcher. He was promoted to Head of the Operations Research and Statistics Division of the CSIR in 1986. Thereafter he was manager and programme manager in various capacities at a number of divisions of the CSIR, most notably the Centre for Advanced Computing and Decision Support (1987-1991), Decision Support Services (1991-1997) and the Centre for Logistics and Decision Support (2003-2005). He currently heads the Centre for Logistics at the CSIR.

Hans has been a member of ORSSA since 1973 and has served on the Executive of ORSSA since 1977 (as Pretoria Chapter Secretary (1977-79), as Pretoria Chapter Chair (1979-81), as National Treasurer of ORSSA (1982-85 and 1987-88), as Business Manager of ORION (1985-93), and twice as President of ORSSA (1986-87 and 2001-03)). He has twice received the Tom Rozwadowski Medal (with TJ Stewart in 1978 and with DC Currin in 1985). Hans has also been a member of INFORMS (since 1980), a member of the Statistical Association of South Africa (since 1991), a member of the Operational Research Society of the United Kingdom (since 1993), and a member of the Council of Logistics Management of America (since 1995). In addition he has served on the editorial and advisory boards of a number of journals and has organised a large number of national and international operations research conferences. He has published 11 peer-reviewed papers, a large number of technical reports and popular articles, and has delivered 63 conference papers. He has also acted as external examiner for theses at six universities (locally and abroad).

For his services to Operations Research in general, his services to ORSSA in particular and his nurturing of operations researchers at the CSIR over many years he was duly and unanimously elected Fellow of the Operations Research Society of South Africa in August 2005.



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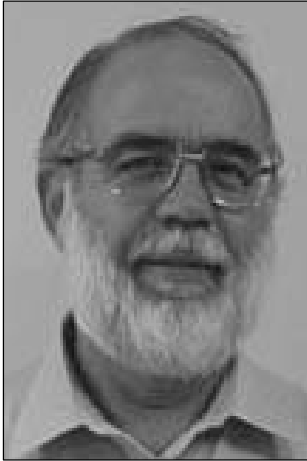
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# NEW FELLOW OF ORSSA: THEODORE J STEWART

By Wim Gevers (wg@sun.ac.za)



**“I believe that there is an important, even critical, role for decision analysis and operations research in addressing many planning and development problems in South Africa, but we lack the people to do it.”**

**Theo Stewart**

*Citation.* Theodore J Stewart was born in Cape Town on 16th September 1943. In 1963 he obtained the BSc (Eng) degree in Chemical Engineering from the University of Cape Town. Thereafter he read Operations Research and obtained the degree BSc (Hons) in Operations Research in 1972 and the MSc-degree in Operations Research a year later, both from Unisa. His MSc thesis topic was “A production scheduling algorithm for a multi-product, multi-facility situation with capacity constraints.” In 1976 he obtained a PhD in Mathematical Statistics, also from Unisa, on a dissertation with the topic: “Bayes optimal experimental design for determination of a response surface maximum.”

Theo Stewart started his career in the employment of Corner House Group, where he was involved as chemical engineer with mineral processing plants and laboratories. In 1967 he moved to the Sentrachem group where he advanced to Plant Superintendent: Formulations of Klipfontein Organic Products at Chloorkop. In 1971 he joined the CSIR in Pretoria where he spent more than 13 years, culminating in the position of Director and Head of Operations Research and Statistics. Since July 1984 he has been Professor in the Department of

Statistical Sciences of the University of Cape Town. He has held Visiting Professor positions at various universities in Europe during 1993-2002.

Theo has co-authored 3 books and published 65 refereed papers or reports. He is a regular contributor to conferences and has read 82 conference papers, primarily in the broad area of Multiple Criteria Decision Analysis. He has supervised 7 PhD's to completion. Currently he is evaluated as an A-rated researcher by the National Research Foundation of South Africa. In addition he is a member of the Academy of Science of South Africa. The quality of his publications has been acknowledged by ORSSA who have awarded him the Tom Roswadowski Medal on five occasions: in 1978 (with HW Ittmann), 1981, 1984, 1995 and 1996 (with L Scott).

Theo is a member of ORSSA, ORS, INFORMS, SAIIE, ASA and a fellow and past president of SASA as well as a registered professional Engineer in South Africa. Theo has served the Operations Research community in a variety of ways. He served the Society as President in 1978 and from 1984 to 1989 he was the founding editor of ORiON. Since then he has regularly served on the executive in a variety of capacities, amongst them as chair of the Western Cape and Pretoria chapters of ORSSA. He is a current Vice-President of IFORS, as well as President of the International Society on Multiple Criteria Decision Making. He has organised a number of international conferences and has been coordinator of ESIGMA, the European Special Interest Group on Multicriteria Analysis since 1996. He serves on the editorial advisory boards of Journal of Multi-Criteria Decision Analysis, Journal of the Operational Research Society, the editorial board of International Transactions of Operational Research and is associate editor of Omega and ORiON.

For his services to and impact on operations research in general (both locally and abroad), his leading international role in the field of Multiple Criteria Decision Analysis, his services to ORSSA, his role in the international OR community as well as mentor to many students at UCT over more than 20 years, he was duly and unanimously elected Fellow of the Operations Research Society of South Africa in August 2005.

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# The Tom Rozwadowski Award 2005

## Some Insight into the Selection Process

by Paul Fatti ([fatti@stats.wits.ac.za](mailto:fatti@stats.wits.ac.za))



**Esbeth van Dyk receiving the Tom Rozwadowski medal from the president, Wim Gevers.**

The Tom Rozwadowski Medal was instituted more than 30 years ago in honour of one of ORSSA's founding members and enthusiastic OR practitioner, who met his untimely death during a trip to the USA. The award is normally made to the author(s), who are members of ORSSA, of the best paper which appeared in print during the previous year.

For this year's award, all the papers appearing in volumes 19 and 20 of ORiON were considered, as well as papers appearing in other OR journals which were authored by ORSSA members. Out of these, the nomination committee selected a short list of seven papers for consideration by the selection committee. This year's selection committee comprised Hans Ittmann (CSIR), Jan van Vuuren (Stellenbosch University) and Paul Fatti (Wits University) – Wim Gevers, ORSSA president, eventually had to recuse himself because of work pressure.

The spirit of the Tom Rozwadowski Award is encapsulated in the six criteria which are used to evaluate the papers:

- Originality
- Quality of any theory developed

- Interaction between theory and practice
- New areas of application
- New opportunities created for Operations Research
- Clarity of Exposition

Being OR practitioners, the members of the committee decided to use a multi-criteria approach to the evaluation process. Saaty's Analytic Hierarchy Process (AHP) was used to establish relative weights for the six criteria, using the method of pairwise comparisons. Each member compared each of the 15 pairs of criteria according to Saaty's 1 to 9 preference scale and the three members' scores were combined by geometric averaging (being on a ratio scale). While there were disagreements amongst the members on some of the comparisons, the set of combined scores were remarkably consistent. The eigenvector method was used to compute the relative weights for the six criteria from the matrix of combined pairwise comparisons scores. The inconsistency ratio for this matrix was only 3% and yielded the following set of weights:

Criterion	Weight
Originality	23%
Quality of theory	7%
Interaction	41%
New Areas	9%
New Opportunities	13%
Clarity	7%

It is quite clear where the committee's emphasis lay!

Each member rated each paper according to each of the criteria, and the average ratings for each of the criteria were then combined according to the above weights. This provided a final score for each paper. While the scores of most of the papers were quite close, one of them stood out head and shoulders above the rest.

The 2005 Tom Rozwadowski Medal has been awarded to FE van Dyk and E Maspero, both from the CSIR, for their paper: "An analysis of the South African fruit logistics infrastructure", which appeared in ORiON 20 (1), (2004), pp.55-72. Congratulations Esbeth and Emma!



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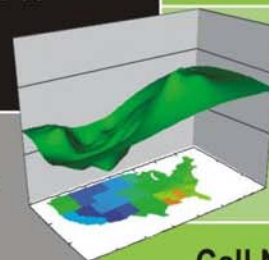
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