

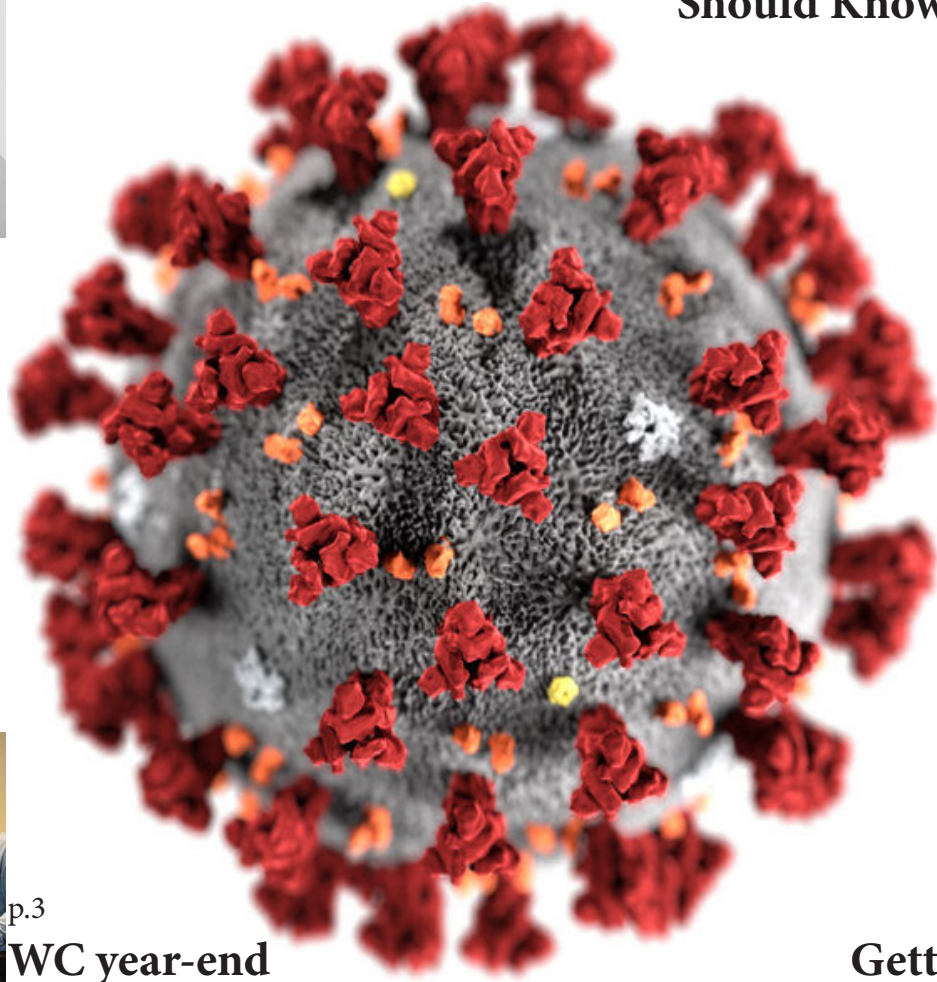
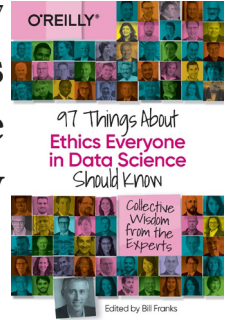


# AT THE FOREFRONT OF ANALYTICS IN AFRICA

p.10  
**ORSSA Annual Conference**



p.7  
**97 Things About Ethics Everyone In Data Science Should Know**



p.3  
**SAIIE Awards**



p.3  
**WC year-end function**



p.5  
**Getting to know professor Montaz Ali**



[www.orssa.org.za](http://www.orssa.org.za)



@ORSocietySA



@\_ORSSA



The Operations Research Society of South Africa



ORSSA

## ORSSA Newsletter December 2020

# THE PRESIDENT ELECT'S DESK



**Dave Evans**  
daveevans@gmail.com

I'm writing this as we come to the end of the strangest year that practically any of us will be able to remember. Covid's impact on ORSSA has obviously been significant – as it has been everywhere else. Face to face 'anythings' ceased: full marks and huge thanks to the chapters for keeping things going via on-line Meet-Ups and Seminars. The one arranged by the Western Cape Chapter and presented by Sheetal Silal on the work she and her team were doing on modelling Covid was a particular highlight. And similar thanks to the primarily Joburg Chapter team who organised our on-line national conference, once it became clear that the live one that the Vaal Triangle Chapter were organising could not take place. It also gave us some ideas for including on-line components in future 'live' conferences.

On that topic, the current plan is to hold a 'live' 2021 conference at the North West University campus in Potchefstroom from 12th to 15th September, possibly jointly with AFROS – the African Federation of OR Societies, of which ORSSA is a founding member.

For all meaningful purposes, the Society has had no treasurer for three years now. The most conspicuous consequences of that are that our membership fees collections in 2019 were about a third of what they should have been, invoices for 2020 fees are only going out now, in December, and we have very little idea of how many members we really have. Although we have

about 350 people on our membership database, the number of 'real' members may now be as low as 225.

A new Executive Committee was elected at the on-line AGM early in December, when I was elected as National President for 2021 and the above are all administrative issues which we will be addressing with a very high priority in the coming year.

In addition, the Society's strategy, and the 'spread' of the Exco portfolios need attention. And anyone familiar with strategic management will know the sequence of Mission, Vision, Objectives (what to do...) and strategy (how...): the Society has very little defined in this space. Several of our international 'sister' organisations such as the UK's OR Society and the American INFORMS have covered these topics, so there are good sample ideas available. We will therefore be having Exco workshops early in 2021 to tackle all the above and define the strategy to deliver what needs doing over the coming year.

I commit to keeping members up to date with how this all progresses and what the outcomes are, so watch this space. Feel free to contact me at the email address above with any questions or suggestions.

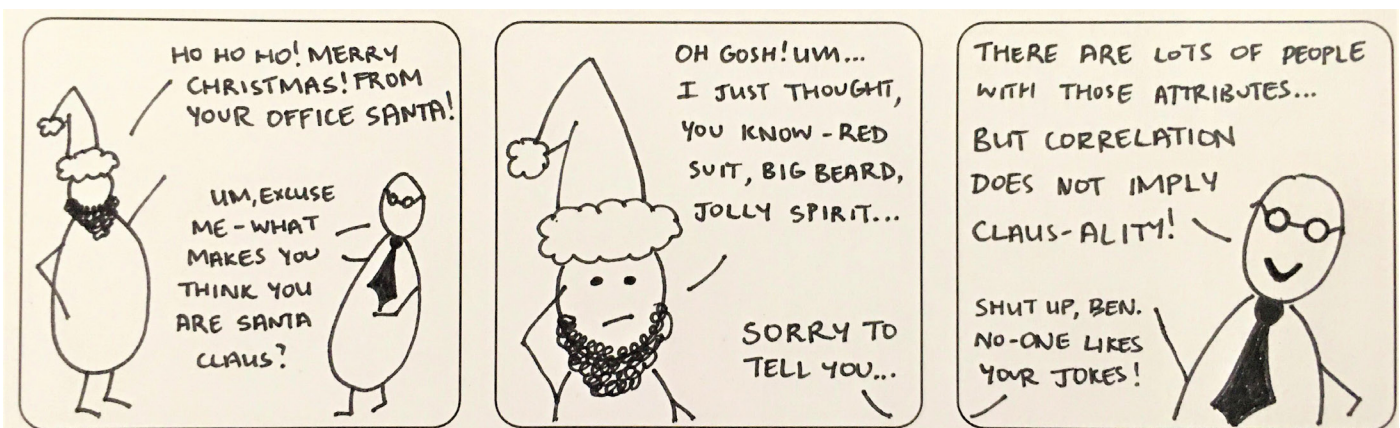
Please take care over the festive season, and make sure that it is enjoyable, safe and healthy.

Dave Evans  
President Elect

## FEATURES

The President Elect's Desk	2
Chapter Update: Western Cape	3
News Flashes	3
From the Editor	4
Profile: Professor Montaz Ali	5
Book Review	7
Conference highlights	10

## Christmas party in the Statistics Department



# WESTERN CAPE YEAR-END FUNCTION

The Western Cape Chapter year-end function and AGM was held at Neethlingshof on 19 November where the attendees enjoyed a food and wine pairing. The respective medal winners of the ORSSA Annual Conference also received their medals.



Photo: Prof Stewart awards the Theodore Stewart medal to Jacqueline.



Photo: Prof Geldenhuys awards the Gerhard Geldenhuys medal to Willem.



# NEWS FLASHES

**SAIIE Award**  
for Best Industrial Engineering Paper  
Published



**Jacqueline Kazmaier, Jan H. van Vuuren**

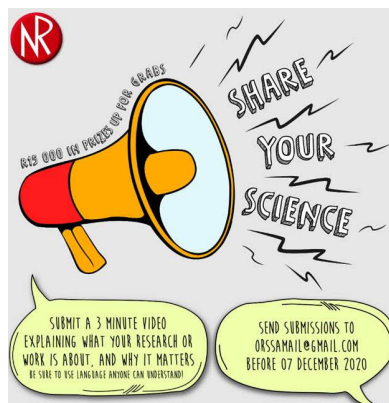
A generic framework for sentiment analysis:  
Leveraging opinion-bearing data to inform decision making



**SAIIE Award**  
for Best Industrial Engineering  
Excellence in Teaching & Learning



**Stephan Nel**



The entries for the Share Your Science competition for 2020 has officially closed.

Keep an eye on the [ORSSA YouTube](#) page for the top entries and to cast your vote by liking the videos.

# FROM THE EDITOR



**Annelie Wessels**  
 annelie99@hotmail.com

What has been the fastest slow-paced year I have ever experienced, has come to an end. Although many of us are looking forward to 2021 and the normality it might bring, it is often forgotten that the pandemic does not have an expiry date like the calendar of 2020. With that said, I do hope that 2021 will bring more normality, but that we will also take all the important things we realised this year, with us: The new methods of doing, working, teaching, communicating, loving and just being. I wish for everyone to create more family time, to appreciate loved ones, to do something meaningful, whether that is within your job, within your home, within yourself or somewhere else.

I, myself, took a break this year from my normal routine, spent six months abroad where I had to attend classes again, doing group projects with students from different countries. I had to learn how to communicate with people from different cultures, using different transportation systems, adapting to failed plans and rejoicing in blessed opportunities.

While I am writing this letter, I am looking outside

my window and cannot help to think about all the things I can be thankful for. The view, amongst other things, is pretty high on that list.



This year we published some great news in terms of competitions, awards won by members of the society, some excellent research done and some highlights within the different chapters. In this specific edition we learn more about Professor Ali and look back on some conference highlights.

I enjoyed publishing the newsletter and wish the best of luck to the new editor. Whether the format of the newsletter will stay the same or not, I hope the purpose of the newsletter, to inform everyone in the society of the latest news, will stay the same.

Groete uit die Boland  
 Annelie

DEFINITIVE MULTIMETHOD MODELING ENVIRONMENT

SYSTEM DYNAMICS

PROCESS-CENTRIC (DISCRETE EVENT)

AGENT BASED MODELING

Distributed by:  
 Blue Stallion Technologies  
 Tel: (011) 447 9916  
 Fax: (011) 447 9911  
 info@bluestallion.co.za

- Manufacturing and production
- Transportation and warehousing
- Healthcare
- Supply chains and logistics
- Markets and competition
- Business processes and service systems
- Airports, stations and shopping malls
- Social dynamics



## PROFESSOR MONTAZ ALI



**Montaz Ali**  
Montaz.Ali@wits.ac.za

### A little background about professor Montaz Ali:

After completing my MSc degree in operations Research, I pursued my PhD degree at Loughborough University, UK, where I performed research

into application of stochastic methods of global optimization in solving various engineering problems. These problems required both the skills of mathematics and statistics. After the completion of my PhD I worked as a postdoctoral fellow in Plymouth University, UK, and Abo Akademi, Finland, before joining Wits in January 1997. After working 15 years at the School of Computational and Applied Mathematics, I joined as a research chair Professor at TCSE (Transnet Sponsored Research Centre) at Wits for 5 years, before moving back to the School of Computer Science and Applied Mathematics at Wits.

During the last 17 years, I have been one of the co-organizers and participant of the Industrial Mathematics Study Group South Africa (the MISGSA Workshop as it is commonly known).

For the last few years I have been doing research on various topics in data science. Since 2019 I have been a National Committee member for Data Science in South Africa.

### 1. What did you study and how did you end up in Operations Research?

I have an honours degree in mathematics and statistics and an MSc in Operations Research. As a Transnet Sponsored Research Chair, I have worked on numerous operations research and logistics problems (trivial to difficult, simple to complex) which arose in Transnet. My position at TCSE has placed me in a perfect position for industrial collaboration. I have been involved in a number of Transnet problems, including optimization and logistics problems in Richard Bay (2nd largest port in southern hemisphere) port terminal, management of wagon and locomotive fleet and optimization in Transnet value chain. These are a few problems, amongst many others under Transnet's Market Demand Strategy (MDS), which were targeted to expand and modernize the country's ports, rail and pipeline infrastructures.

Since 2004, the annual MISGSA event has been assisting South African Industries with solutions for problems submitted by industries. I have had the

opportunity to work on many operations research related problems from various South African industries through MISGSA.

### 2. What did you do after your studies?

After completing my MSc degree I worked as a trainee actuary for two years in the largest life insurance company, before pursuing my PhD in the UK.

### 3. When and how were you first introduced to ORSSA?

I am a regular participant of ORSSA's Annual Conference. Soon after my joining as a lecturer at Wits, Professor Paul Fatti of Wits introduced me to ORSSA, back in 1998. I presented the Keynote Address at the Annual General Meeting of the Johannesburg Chapter on 12 November 2008.

### 4. When did you decide that you wanted to come back to academia?

After working as a trainee actuary for two years, I decided to pursue my PhD in 1989 and be associated with academics.

### 5. What subject or year do you enjoy lecturing the most?

Discrete Optimization, a core topic in Operations Research.

### 6. You taught a lot of subjects and did research in quite a few areas. Which area of OR do you enjoy most?

The Airline Scheduling Problem was the most important research topic for me where I supervised one MSc and two PhD's.

### 7. What part of your job do you like most?

Engaging with students in my lecturing i.e. lecturing.

### 8. What is it about OR that got you interested and is keeping you interested?

The newness of OR problems was most fascinating for me.

### 9. What task do you always leave for last?

None.

### 10. What do you enjoy doing in your free time?

Gardening and being with my family.

### 11. How do you experience online teaching?

Many issues were unknown to me which became clear during online lecturing. This year all my video lectures will be given to my next years' students once I have completed my lectures.

### 12. How would you describe OR in one sentence?

OR is all about real-life problem solving.

### 13. What do you wish the world knew about OR?

Put your mathematical, statistical and computing skills in practice by solving OR problems.

“

OR is all about real-life problem solving

14. If you did not pursue a career in OR, what other field might you have ended up in?

A non-exciting and non-applied pure mathematician.

15. Can you pick a career highlight (or two) in your life?

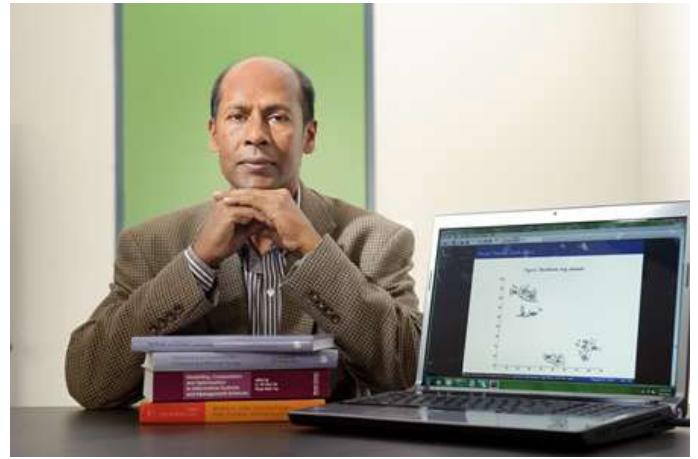
We are about to present a first ever non-linear airline scheduling model in the literature of OR.

16. One of your biggest challenges?

To attract good quality research students to perform research in OR.

17. One of the most interesting research papers/problems that you were involved in?

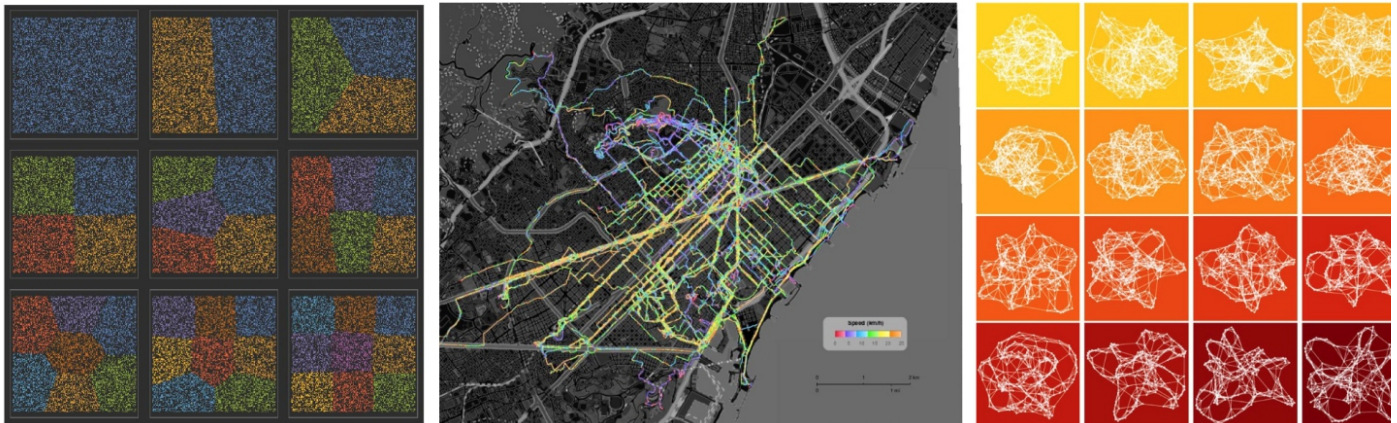
Call Centre's Optimization Problem of a Cell Phone industry in South Africa.



“

We are about to present a first ever non-linear airline scheduling model in the literature of OR

## Wolfram Multiparadigm Data Science



Multiparadigm data science use modern analytical techniques, automation, and human-data interfaces to arrive at better answers with flexibility and scale, whether it's **automated machine learning** and report generation, **natural language queries of data** for instant visualizations, or **implementing neural networks** with ease and efficiency.

<http://mpdatascience.com>



Distributed by:  
 Blue Stallion Technologies  
 Tel: (011) 447 9916  
 Fax: (011) 447 9911  
 info@bluestallion.co.za

# 97 THINGS ABOUT ETHICS EVERYONE IN DATA SCIENCE SHOULD KNOW

97 Things About Ethics Everyone in Data Science Should Know by Bill Franks (ed), 2020, O'Reilly Media, Inc, 1005 Gravenstein Highway North, Sebastopol, CA 95472, USA. 1st edition (August 6, 2020), pp. 346, ISBN-10: 1492072664 (Kindle), ISBN-13: 978-1492072669 (Paperback), 26.96 US dollar (Paperback), 32.30 US Dollar (Kindle).



**Hans W. Ittmann**  
hittmann01@gmail.com

Through the multitude of technological devices available today, massive amounts of data are captured and produced on an ongoing basis. The data is analysed, provides input to decisions and the question is “how reliable is this?”. In addition, organizations are increasingly using advanced analytics, like deep learning, to partially or fully automate decision making. Artificial Intelligence (AI) and machine learning, a particular approach to AI, may soon have significant impacts on our everyday lives. AI can be defined as the artificial creation of human-like intelligence that can learn, reason, plan, perceive, or process natural language. Conversely machine learning makes use of learning algorithms, that make inferences from data to learn new tasks. All these developments create immense socio-economic opportunities, but they also pose serious ethical and socio-economic challenges. The implications of this are that analytics and data science organizations should be deliberate in their pursuit of doing only ethical work.

“

AI and machine learning, a particular approach to AI, may soon have significant impacts on our everyday lives

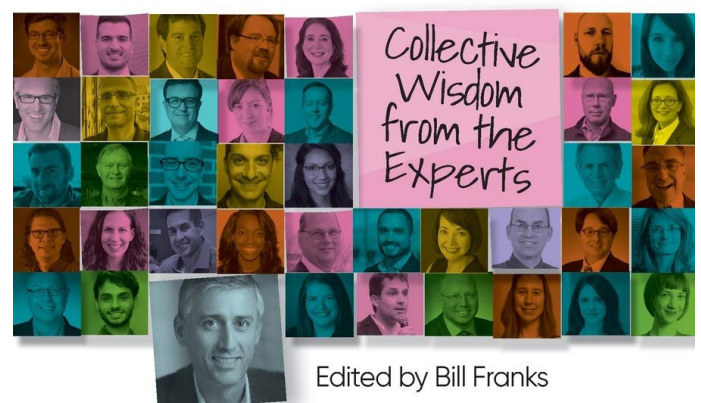
There is a fair number of scholars that have written about ethical issues in OR/MS. What is striking of this literature is the variety of approaches, methods, and recommendations. Ethics in OR/MS is a developing field without a well-defined set of concepts, methods, prescriptions, or a shared culture. Nevertheless, one finds a few passionate researchers who address a wide range of ethical issues, from environmental sustainability to social justice and human values. It is within this context that this book review is presented.

Two aspects were the driving force behind the book, 97 Things About Ethics Everyone in Data Science Should Know. Firstly, more and more analytical processes are being fully automated and embedded in decision processes. Secondly, the nature of AI is such that people feel uncomfortable around what is happening within the AI algorithms and why it is happening. There should be no concerns that AI is being used in an appropriate manner.

Ethics is an exceedingly difficult topic and much fuzzier than we think. There are different views on what exactly it encompasses. Ethical decisions are not as clear cut as we allow ourselves to believe. There are always exceptions to the rule and unusual situations will require judgement on what the appropriate and ethical action is. It is exactly for this reason that this book has been put together to allow different people to share their respective views about ethics. It is only



97 Things About  
**Ethics Everyone  
in Data Science  
Should Know**



Edited by Bill Franks

through such an endeavour that the analytics and data science community is exposed to different views and in this way get a better understanding of this difficult issue. At the same time the community starts understanding the importance of applying proper ethics to analytics and data science initiatives.

“

Ethics is an exceedingly difficult topic and much fuzzier than we think

To give a sense of what we are dealing with, here is an example from one of the short pieces in the book. “It is much flashier to say “The AI learned to do this task all by itself” than to tell the truth: People used a tool with a cool name to help write code. They fed in examples they considered appropriate, found some patterns in them, and turned those patterns into instructions. Then they checked whether they like what those instructions did for them”. The truth drips with human subjectivity by just looking at all the small choices along the way that are left up to people running the project. This is a classic example of Algorithmic Bias – a situation in which the system reflects the implicit values of the people who created it.

What is contained in the book is the collective wisdom of experts, 97 of them from industry and academic institutions. Each wrote a short piece on a wide range of interesting aspects concerning ethics, giving different views. These cover both expected and unexpected elements around the topic. The emphasis is on “know” with the reader being exposed to, or getting familiarised with, these opinions. It is certainly not the idea that 97 “boxes” need to be ticked off when written AI code or a machine learning algorithm!

The book is structured into seven high-level themes, which makes it easy for the reader that is interested in a specific aspect of ethics such as policy guidelines. Secondly, it allows for comparing, and contrasting views much easier. The contributions are all stand alone and the length of each one is typically four to five pages. The seven high-level themes are the following:

- I. Foundational ethical principles – it contains reminders of broad ethical frameworks which our civilization operates under;
- II. Data science and society – how do societal norms intersect with ethical issues;
- III. The ethics of data – the ethical issues specific to the collection and usage of data, that underlies analytics and data science processes;

IV. Defining appropriate targets and appropriate usage – ensure that any analytics and data science process is targeting an ethical goal and ensuring that the results are applied in an ethical fashion;

V. Ensuring proper transparency and monitoring – the level of transparency required when building and deploying analytics and data science processes and ongoing monitoring to ensure that the processes act as anticipated;

VI. Policy guidelines – to guide analytics and data science practices; and

VII. Industry specific case studies – examples of where ethical considerations arose.

A few interesting topics include “The Truth about AI Bias”, “Probability – the Law that Governs Analytical Ethics”, “Ethical is not a Binary Concept”, “Algorithms are used differently than Human Decision Makers” and “Data Ethics – Three Key Actions for the Analytics Leader”.

It would be unwise to try to read the book in one sitting. Most of what is presented, even just in each short piece, requires focussed attention and reflection. Reading it in this way, the most value will be absorbed, and it will assist the reader in fully understanding, and appreciating, the importance of applying proper ethics to analytics and data science initiatives.

The world has changed and there are today even world leaders that struggle with the concept of “truth”. For the OR/MS researcher or practitioner of the past, ethics was not an issue since it was part of their value system. Most of those operating in this space today possess the same values. However, in a changing world, there is no doubt that ethical principles are needed much more consciously. The 97 short pieces is a good source for creating this awareness.

It is fitting to conclude with the following insight and view of two prominent operations researchers concerning ethics in OR/MS: “Reflecting on the history of ethics in OR/MS, it is striking how much this has been an on-going process. Ethics is not a problem to be solved. There is no definitive answer to ethical issues in OR/MS that can be nailed down in an academic article, a special issue, or a book. Rather, ethics is nourished by the passion of people who discover in the promotion of ethical issues a self-fulfilling motivation and thereby hope to positively contribute towards others” (Le Menestrel & Van Wassenhoven, 2009).

<sup>1</sup>Le Menestrel M & Van Wassenhove LN, 2009. Ethics in Operations Research and Management Sciences: A never-ending effort to combine rigor and passion. *Omega* 37 (6), 1039-1043(2009), doi: 10.1016/j.omega.2008.12.009



Optimise your career through research collaboration or by obtaining a degree through the Industrial Engineering Department at Stellenbosch University.

*Supply chain*  
**LOGISTICS**  
*Facility planning*  
*Push & Pull systems*  
*Packing*  
*Inventory management*

Doing it better

*Bio-mechanical body parts*  
**MANUFACTURING**  
*Machining*  
*Robotics*  
*Rapid prototyping*  
*Micro milling*  
*Micro injection molding*

*Systems dynamics*  
**ANALYTICS**  
*Statistical analysis*  
*Business analysis*  
*Simulation*  
*Planning*  
**SYNTHESIS**  
*Decision support*  
*Optimisation*

*Economic modelling*  
**MANAGEMENT**  
*Business analysis*  
*Operations management*  
*Knowledge management*  
*Project management*  
*Change management*  
*TIME FOR CHANGE*

BEng (Industrial), MEng (Research) or MEng (Structured) (Engineering Management), MEng (Research) or MEng (Structured) (Industrial Engineering), PhD, Postgraduate Diploma in Engineering Management or Industrial Engineering

Industrial Engineering  
@ Stellenbosch University

[www.ie.sun.ac.za](http://www.ie.sun.ac.za)



# ORSSA ANNUAL CONFERENCE

## Gerhard Geldenhuys Medal

Honours / Fourth Year Student Competition



### Willem Moore

Department of Industrial Engineering  
Stellenbosch University

Shared-resource school timetabling decision support  
Supervisor: Professor Jan van Vuuren



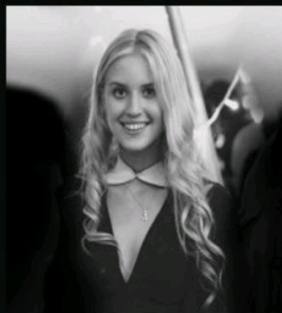
Click [here](#) to read more about Willem's research.

A summary of Jacqueline's research

Unstructured data, such as customer reviews, chat forums and news articles, have become a more and more prominent source of information over the last few years. Many of these data sources also contain some degree of sentiment (e.g. a message from a complaining customer, a news article satirising a politician). While it's relatively easy for humans to read and make sense of such data, automating these tasks presents considerable challenges.

## Theodore Stewart Medal

Masters Student Competition



### Jacqueline Kazmaier

Department of Industrial Engineering  
Stellenbosch University

A framework for evaluating unstructured text data using sentiment analysis  
Supervisor: Professor Jan van Vuuren



es. The focus of my research was creating a framework that can be used to automatically extract actionable insights from a large collection of opinion-bearing text documents to drive decision making. In one of my case studies, for example, the framework was applied to determine the issues that were raised in customer complaints about a retail bank, and, moreover, to link these issues to a specific customer or branch profile.

### ORSSA 2020

GERHARD GELDENHUYS  
MEDAL FINALIST



PIETER STEENKAMP

DEPARTMENT OF INDUSTRIAL ENGINEERING, SU

REGISTER AT ORSSA2020.COM

### ORSSA 2020

THEODOR STEWART  
MEDAL FINALIST



DJ HUMAN

DEPARTMENT OF LOGISTICS, SU

REGISTER AT ORSSA2020.COM



Category prizes

Category II

To a current member of ORSSA for a single, outstanding achievement with respect to the practicing of OR on a national level



Dr Sheetal Silal

Department of Statistical Sciences & Modelling and Simulation Hub (MASHA), University of Cape Town

Honorary Visiting Research Fellow in Tropical Disease Modelling at the Nuffield Department of Medicine, Oxford University

Research Associate at the South African DST-NRF Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA) at Stellenbosch University



Category IV

To an upcoming member of ORSSA of age 35 or below for excellence in OR practice



Dr Christa De Kock

SUnORE  
Department of Industrial Engineering  
Stellenbosch University



ORSSA's premier yearly award, the Tom Rozwadowski Medal, goes to RG Rakotonirainy, I Durbach and J Nyirenda for their paper in ORiON: "Considering fairness in the load shedding scheduling problem".

Congratulations!!

<https://orion.journals.ac.za/pub/article/view/648>

#orssa2020



**RiO** ORION.JOURNALS.AC.ZA  
Considering fairness in the load shedding scheduling problem | ORiON



Keynote speakers

<p>ORSSA 2020 KEYNOTE SPEAKER</p>  <p>PROF TSHILIDZI MARWALA</p> <p>VICE-CHANCELLOR AND PRINCIPAL AT UNIVERSITY OF JOHANNESBURG AND TRUSTEE OF THE NELSON MANDELA FOUNDATION</p> <p>REGISTER AT ORSSA2020.COM</p>	<p>ORSSA 2020 KEYNOTE SPEAKER</p>  <p>PROF PASCAL VAN HENTENRYCK</p> <p>ASSOCIATE CHAIR FOR INNOVATION AND ENTREPRENEURSHIP AND A. RUSSELL CHANDLER III CHAIR AND PROFESSOR</p> <p>REGISTER AT ORSSA2020.COM</p>	<p>ORSSA 2020 KEYNOTE SPEAKER</p>  <p>PROF HATEM MASRI</p> <p>DEAN OF THE COLLEGE OF BUSINESS ADMINISTRATION, UNIVERSITY OF BAHRAIN AND PRESIDENT OF THE AFRICAN FEDERATION OF OPERATIONS RESEARCH SOCIETIES</p> <p>REGISTER AT ORSSA2020.COM</p>
--	---	--

Sponsors



**HAPPY**  
*Holidays*

*Merry Christmas and a prosperous new year!*