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STAFF MATTERS

Department appoints first female full professor

Prof Sugnet Lubbe, the first female full professor in the Department of Statistics and Actuarial Science, discovered the subject Mathematical Statistics in her second year as a student at Stellenbosch University (SU) and never looked back.

"I love the practical application of mathematics to analyse data," she says.

She obtained all her degrees in Mathematical Statistics – undergraduate as well as postgraduate – at SU and completed her PhD under supervision of Prof Niël le Roux, emeritus professor of Statistics. After completing her doctoral studies, she continued her research activities while working as a statistician for British American Tobacco (BAT) in Stellenbosch.

"I continued doing research with Prof Le Roux, not with the goal of returning to the academic world but because I love research. Maybe I always knew that this is where I belong."

Before applying for the position of professor at Stellenbosch University, Prof Lubbe was an associate professor in the Department of Statistical Sciences at UCT for more than seven years. Becoming a full professor was one of her goals after returning to the academic fold, and she is happy and proud to be the first female full professor in the Department.

She presents Mathematical Statistics to second-year students as well as two master's modules on multi-dimensional scaling. She also assists the Faculty of Engineering with a Statistics module.

According to Prof Lubbe, graduates with a background in Statistics are in high demand.

"The field is exploding. People are calling it Data Science – no-one is sure what exactly it means but everyone more or less agrees that Statistics is an important component."

She referred to the definition of this term in her inaugural lecture "Essential Data Science maps to safely navigate potholes".

"So much data is being generated and there is a huge need for people to analyse and extract information from this data. A love for mathematics as well as problem-solving and analytical skills are important attributes for young people interested in this field."

Prof Lubbe is passionate about research and would like to obtain a B rating from the National Research Foundation. She currently has a C rating, which indicates that she is an established researcher. B ratings are awarded to internationally acclaimed researchers.

"There are so many research ideas and only 24 hours in a day. The scope for research is huge," she adds.



Prof Sugnet Lubbe (right) and Prof Ingrid Woolard, Dean of the Faculty of Economic and Management Sciences (left).

Apart from teaching and research, networking is also very important. This year, Prof Lubbe delivered presentations at the BRICS mathematics conference in Brazil as well as at the International Conference on Computational Statistics (COMPSTAT) in Romania. She serves as chairperson of the South African Statistical Association's Multivariate Data Analysis Group (MDAG) as well as treasurer of the International Federation of Classification Societies.

MDAG will host the first Correspondence Analysis and Related Methods (CARME) conference outside of Europe in Stellenbosch next year, and Prof Lubbe is serving as head of the local organising committee for this event.

"It is important to make a contribution," she believes.

– See P3 for her inaugural lecture.

on the right of the equation. The first matrix (**A**) represents the rows of **X** while the second matrix (**B**) represents the columns. The value “-3” in row 2 column 3 of **X** is represented by the so-called inner product of \mathbf{a}_2 and \mathbf{b}_3 . The inner product is given by the length of \mathbf{b}_3 times the length of the orthogonal projection of \mathbf{a}_2 unto \mathbf{b}_3 . In my opinion, this sounds nearly impossible to “see” from the plot.

Luckily, the watershed moment came in 1996 with the publication of Biplots by John Gower and David Hand. According to the Gower and Hand philosophy, biplots can be viewed as the multivariate analogue of scatterplots as shown in Figure 2. The biplot provides a single view of a multidimensional data set, representing samples, variables and the relationship between samples and variables. In the example in Figure 2, further information is added by colouring the background according to the values associated with each point in the biplot.

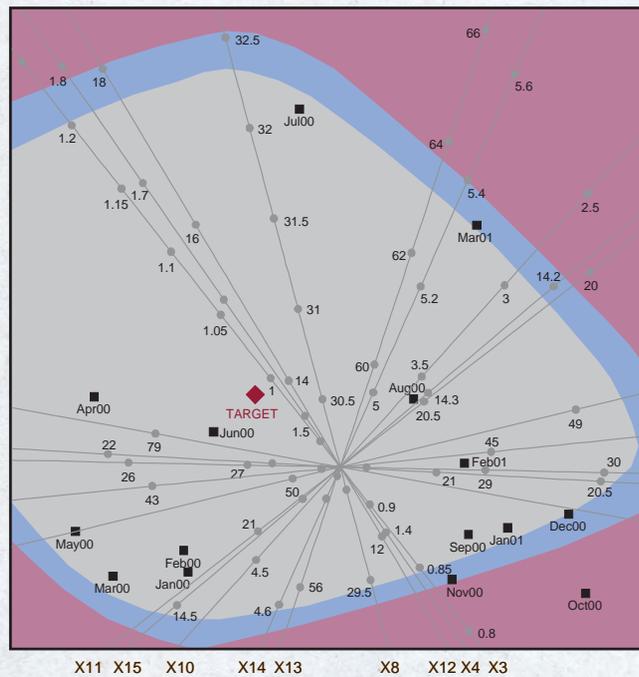


Figure 2: Principal component analysis biplot according to the Gower and Hand (1996) philosophy.

A data set usually consists of rows \times columns and is typically high dimensional, meaning we have many (more than two) rows and columns. For visualisation with maps, we are restricted to the 3D world we are living in. Graphical visualisations of the data are obtained as the best 2D (sometimes 3D) representation of the data. This means the map approximates the multidimensional data set. How to find the “best” representation depends on the function of the specific map. The prefix “bi-” in biplots refer to the simultaneous representation of the rows and columns of the data set.

My first practical application in the usefulness of these biplot maps to guide decision making came in discriminating between stinkwood (*Ocotea bullata*) and imbuia (*Ocotea porosa*) used for old Cape furniture. The question posed to us was whether we can use statistics to distinguish amongst microscopic measurements of three different wood subspecies - stinkwood, imbuia and *Ocotea kenyensis* which is not used for furniture. The map in Figure 3 shows clear separation between the groups. When a controversial chair had to be auctioned and therefore classified as either stinkwood or imbuia the map could assist in the decision-making process. Measuring the three relevant variables on a small piece of wood from the chair, the data point could be added to the map and clearly the star in Figure 3 suggests that the chair is imbuia and not stinkwood.



Figure 3: Canonical variate analysis biplot of *Ocotea* data, separating three subspecies.

In conclusion

A variety of different Data Science maps can be constructed, depending on the data set and visualisation aim. In addition to principal component biplots which provide an overall map of the data and canonical variate analysis biplots which separate groups of observations, analysis of distance biplots and a classification triplot can be constructed for more general analyses of groups in data. Different dissimilarity measures lead to different multidimensional scaling biplots while categorical data is represented with correspondence analysis of categorical principal component biplots. Three-way data, compositional data and longitudinal data all lead to further extensions of the basic biplot methodology.

Potholes?

So where are the potholes to look out for? When practising good Data Science, one should be aware of not selectively reporting just the surprising results because they draw attention. Statistics is based on probabilities and it could be that this one result is in fact the one in twenty times ($p\text{-value} < 0.05$) that the conclusion is erroneous. Furthermore, analyses and results should be put into the proper context. This is where Data Science maps play an important role: The well-known saying “A picture is worth a thousand words” is explained by Wikipedia (2018) as implying that a complex idea can be conveyed with just a single still image. Equivalently in Data Science, a well-chosen graph can map out a multivariate complex data-story in a single map. These maps guide the way to sound decision making and often suggest suitable questions to ask from the analyses. All in all, biplots are essential maps to safely navigate potholes in the Data Science environment.

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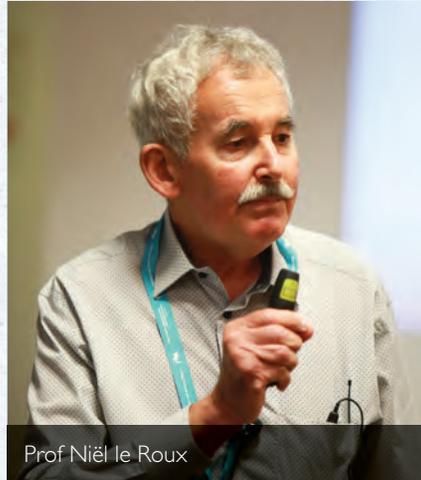
STAFF MATTERS

News from the 2018 SASA Conference



Dr Trudie Sandrock

Dr Trudie Sandrock has been elected as member of the SASA Executive Committee responsible for the portfolio of Newsletter editor:



Prof Niël le Roux

It is with great pleasure that we announce that Prof Niël le Roux has been elected as honorary member of the South African Statistical Association (SASA). An honorary member of SASA is a person who has made an extraordinary contribution to the knowledge of Statistics or to the advancement of the association as such and who has retired from his/her ordinary position.



Prof Tertius de Wet

Prof Tertius de Wet received the prestigious Thought Leader award, sponsored by SAS International, at the South African Statistical Association (SASA) 2018 Conference in Johannesburg.

"A thought leader is a person who has made an impact within the South African statistical community across a wide range of activities and has made significant contributions in academia, industry, government and elsewhere. The criteria include contributions and impacts made in leadership, knowledge generation, human capital development, impact of the work and research, and attracting funding."

Staff in the Department of Statistics and Actuarial Science



1st row: Prof T De Wet, Me HM Cilliers, Prof PJ Mostert, Me L Rhode, Prof PG Slattery

2nd row: Me S Loggenberg, Mr CJ Van der Merwe, Prof M Kidd, Dr H Viljoen, Me H Randall, Dr T Sandrock, Prof S Lubbe, Me E Huysamen

3rd row: Mnr SJ Burgess, Mr D Corubolo, Prof DG Nel, Dr S Bierman, Prof SJ Steel, Mr DR Loggenberg, Mr L Steyn

4th row: Prof WJ Conradie, Dr R Lötter, Dr CJB Muller, Dr MMC Lamont, Dr J Harvey, Mr RJ Clover, Dr D Hofmeyr, Prof DW Uys, Mr M Coxon, Dr F Kamper

PHOTO CREDIT: Anton Jordaan (SSFD/SCPS)

INTERNATIONALISATION

Research showcased internationally



Some of Stellenbosch University delegates at the 5th ECDA: Profs Niël le Roux and Danie Uys in the back row and Johané Nienkemper-Swanepoel in the front row (middle).

Prof Niël le Roux was responsible for organising two special sessions on dimension reduction and visualisation for classification at the 5th European Conference on Data Analysis (ECDA) in Paderborn, Germany, in July. Of the 12 presentations in these two sessions, members from the Department of Statistics and Actuarial Science contributed the following:

- 'Forward Stagewise Linear Regression for Ensemble Methods' by Daniel Uys;
- 'Visualising Incomplete Data with Subset Multiple Correspondence Analysis' by Johané Nienkemper-Swanepoel, Niël le Roux and Sugnet Gardner-Lubbe;
- 'Model Selection for Projected Divisive Clustering' by David Hofmeyr and Nicos Pavlidis;
- 'Unravelling Black Box Machine Learning Technique Predictions using Biplots' by Adriaan Rowan, Sugnet Gardner-Lubbe and Francesca Little;
- 'A Biplot based on a Principal Surface' by Raeesa Ganey and Sugnet Gardner-Lubbe; and
- 'Computing Neural Reliability from EEG Recordings' by Pieter Schoonees and Niël le Roux.

The ECDA took place in the Heinz Nixdorf MuseumsForum, the world's largest computer museum.

Prof Le Roux also went on a study visit to Prof John Gower at Open University, UK, in April 2018. The main purpose of the visit was to work on a book on Canonical Variate Analysis.

ISPS Handa World Blind Championships 2018

Prof Garrett Slattery, head of Actuarial Science, recently returned from participating in the 2018 ISPS Handa World Blind Golf Championships and Italian Blind Golf Open, held in Rome in October. He was part of the SA Protea Team participating in the event, which included five players and their guides.

The SA team included: Garrett Slattery (player), Erich Kliem (guide); Johan Kotze (player), Henk Oberholzer (guide); Ernst Conradie (player), Jurie Maré (guide); Leon Strydom (player), Lizell Muller (guide); and Morné Els (player), Charl Enslin (guide).

The course was an impressive 18-hole (par 72) layout. The primary hazard on the golf course was its numerous water hazards, including some island greens, lakes and rivers.

The SA players did very well. Prof Slattery (who had won his 10th SA Championship earlier in the year) placed 4th (gross) in both the Italian Open and in the World Championships and 2nd (net) in the Italian Open in his sight category. Morné Els (based in the Eastern Cape), representing SA for the first time, finished as runner-up (net) in the World Championships.

Prof Slattery, who has been a member of the International Blind Golf Association's Board of Directors since 2012, has now been elected as vice-chairman. South Africa won the bid to host the next World Championships in 2020.



Members of the SA Protea Team

STUDENT ACHIEVEMENTS



Prof Paul Mostert (chairperson of the Department of Statistics and Actuarial Science), Prof Ingrid Woolard (Dean: Faculty of Economic and Management Sciences), Gerben Draaijer, Prof Ronel du Preez (Vice-Dean: Teaching), and Prof Garrett Slattery (Head: Actuarial Science).

Numbers tell the success story of the 2018 Schumann medal recipient

A gold medal – known as the CGW Schumann medal – is awarded annually by the Faculty of Economic and Management Sciences to an exceptional student who obtained an honours or master's degree in that particular year. Candidates must have completed their undergraduate studies at Stellenbosch University too, in order to ensure a fair comparison of achievements. The award's aim is to acknowledge academic excellence, but an attempt is also made to determine whether the candidate's personality and conduct are indeed such that he/she will be a worthy recipient of the Faculty's highest accolade.

When Gerben Draaijer – recipient of the 2018 CGW Schumann medal for the best postgraduate student in the Faculty of Economic and Management Sciences – had to decide what he wanted to study, he knew it “had to be something to do with numbers and figures”. And numbers also tell the success story of his time as a student in the Department of Statistics and Actuarial Science at Stellenbosch University (SU).

According to Prof Garrett Slattery, head of Actuarial Science, Gerben's academic performance in his four years of study, during which he obtained both his undergraduate (2016) and honours degrees (2017) cum laude, was truly exceptional.

“While it is not uncommon for exceptional students to score over 90% for some modules, Mr Draaijer scored over 90% for most modules in his Bachelor's degree, with his average mark being in the mid-90s and with several module marks of 100%.

“He was the top student in his honours year and was recommended for all of the available exemptions from the examinations of the Actuarial Society of South Africa based on performance in equivalent university modules.”

“Since 2000 we have had only three other students who performed at a level comparable to that of Mr Draaijer, two of whom were recipients of the Chancellor's Medal,” Prof Slattery wrote in his motivation.

Gerben maintains there is only one way to do well academically and that is to work hard. “It is also important to have a plan and to be outset-orientated rather than time-orientated.”

Gerben did, however, not spend his whole university career in front of his books. He was a member of the house committee of Dagbreek men's residence as well as the class representative of the Actuarial Science honours class in 2017. He also served on the management team of the Dempers Meyer mentorship programme for grade 11 learners from previously disadvantaged backgrounds between 2015 and 2017. In 2016 he travelled to Transkei as part of an outreach team to present a winter school for matric learners.

“I feel it is important to try and give something back because I realise that not everybody has the same opportunities. It is also rewarding to have an impact on people's lives. At the end of the day you always get more than you give, though. This keeps you humble and makes you realise the value of relationships.”

One of his ambitions for the future is to make a positive difference in South Africa.

Gerben, who is currently working at KPMG in Cape Town, considers it a great privilege to have been awarded the Schumann Medal – named after the faculty's first dean and awarded annually since 1986. His father Attie, mother Carina, sister Lize, and girlfriend Chané attended the event hosted on 27 July with him.

“Each of them made an important contribution towards this achievement, so it was very special to be able to share it with all of them,” he said.

STUDENT ACHIEVEMENTS

Academic bursaries awarded to students



Marli de Villiers (left) and Albertus Louw(right)

Faantjie and Lettie Pretorius bursary for undergraduate students: The heirs of Prof Faantjie Pretorius, the first professor of Statistics at Stellenbosch University and founder of the Department of Statistics and Actuarial Science, donated a substantial amount of money to the University. The return of this investment is used to award bursaries to deserving students in the Department every year. In 2018, Marli de Villiers and Albertus Louw shared the bursary from this fund.



Karla Vetten

Validus bursary for a Financial Risk Management student: Validus Risk Management Limited based in Windsor, UK, is an international institution that provides financial risk management advisory services. The firm offers risk identification and measurement, risk management strategy designing, risk reporting and monitoring, scenario analysis, and financial market analysis services. Mr Francois Scheepers, an alumnus of the Department of Statistics and Actuarial Science, is a partner and head of technology at Validus. A bursary agreement between Validus and the Department of Statistics and Actuarial Science was finalised at the beginning of 2018. According to this agreement a substantial bursary will be awarded annually to a third-year or honours student in Financial Risk Management. In 2018 the bursary of R70 000 was awarded to Karla Vetten, a third-year BCom (Mathematical Sciences) student with focal area: Financial Risk Management.



Fltr: Daniel de Kock, Brittany Robinson, Jozua Marais, Shannon Roseveare, Nathan Gounder and Guillame Giliomee

Novare bursaries for Financial Risk Management students: The Department of Statistics and Actuarial Science has maintained a very good professional working relationship with Novare since the independent investment advisory business was founded in South Africa in 2000. It has since expanded into Africa. Mr Derrick Roper, a qualified actuary and alumnus of the Department is one of the founding directors of Novare. Through the years, Novare has supported the Financial Risk Management programme substantially in the form of significant financial contributions. This year's donation was used to award bursaries to six third-year students in Financial Risk Management. They are: Daniel de Kock, Brittany Robinson, Jozua Marais, Shannon Roseveare, Nathan Gounder and Guillame Giliomee.

STUDENT ACHIEVEMENTS



Prof Andrie Schoombee (Department of Economics), Prof Niel Krige, Mr Carel van der Merwe (Department of Statistics and Actuarial Science), Kesley Kaps, Prof Ingrid Woolard (Dean: Faculty of Economic and Management Sciences), Jacob Kenyon, Sechaba Mokobane, Jannes Reddig, James Njuguma, Daniella Griffiths, Bianca Peters, David Rodwell, Clio von Petersdorff, Michael Hamman, Mr Doug Abbott (Schroders) and Prof Willie Conradie (Department of Statistics and Actuarial Science). **Photo credit: Anton Jordaan**

Students win big in Schroders essay competition

The field of Data Science is becoming more and more prominent and it was therefore appropriate that a Data Science topic was included in the annual Schroders essay competition, organised by the Department of Statistics and Actuarial Science at Stellenbosch University (SU).

The essay competition forms part of a joint investment research initiative that stems from an agreement signed between the Department and the global asset management firm Schroders in November 2015.

The competition, now in its third year, was open to postgraduate students from the Departments of Statistics and Actuarial Science, Business Management and Economics on topics proposed by Schroders and Correlation Risk Partners. Each topic was assigned to a mentor by Schroders and Correlation Risk Partners, who were available via Skype to give advice and practical insight.

The winners – Jacob Kenyon (Optimising advertisement placement on television: A count regression approach); Jannes Reddig (Life

insurance TV advertising: a Data Science approach); Michael Hamman (Negative interest rate policy and monetary transmission: the European experience); Clio von Petersdorff (Negative interest rate policy); Kesley Kaps (The future of robo-investing: fact or fad?); Sechaba Mokobane (The future of robo-investing: fact or fad?); Daniela Griffiths (Is climate change a real threat to financial stability?); Bianca Peters (The impact of environmental and social risk on future returns); James Njuguma (Defining and measuring investment risk) and David Rodwell (Defining and measuring risk) – walked away with R20 000 each.

Jacob, a master's student in Statistics, was one of five students who decided to tackle the Data Science topic. He appreciated the opportunity to work on real-world data and said that he had to think outside the scope of what he's learned in class to address the problem.

"It required significant time and effort and it is very satisfying to receive a reward. It was definitely worthwhile," he added.

STUDENT ACHIEVEMENTS

Meet the class of 2018

The Department of Statistics and Actuarial Science is proud of its third-year and postgraduate students. These students have come a long way and we wish them well for the future.

Third-year students and lecturers



PHOTO CREDIT:Anton Jordaan (SSFD/SCPS)

Postgraduate students and lecturers



PHOTO CREDIT:Anton Jordaan (SSFD/SCPS)

STUDENT ACHIEVEMENTS

Honours presentations 2018

Each year, the honours students in the Department of Statistics and Actuarial Science have an opportunity to present their honours projects to the Department and other students. This year the presentations took place in October. Below follows a summary of all the sessions as described by the various chairs.

Monday 8 October 2018 (Statistics and Mathematical Statistics)

Chair: Dr C Muller

The true multi-disciplinary nature of Statistics and its application in a myriad of fields was on display during the annual honours project presentations.

In one session a more theoretical project, using an amended form of the SIMEX method and simulated data to investigate measurement error in the explanatory variables when using a retrospective survey design, was sandwiched between two more practical projects. The one explored the use of statistical parametric maps (SPMs) and posterior probability maps (PPMs) when analysing Functional Magnetic Resonance Imaging (fMRI) images of the brain. The second, a multi-label classification project, showcased the field of music information retrieval and how multi-label classification using support vector machines, boosted trees and k-nearest neighbours can be used to classify a piece of music into several emotion labels.

Tuesday 9 October 2018 (Statistics and Mathematical Statistics)

Chair: Prof D Uys

The first project considered the total monthly vehicle sales in South Africa from January 1994 to January 2018. An intervention took place in October 2008 with the global recession affecting vehicle sales. The pre-intervention time series was investigated by using Holt-Winters Exponential smoothing models and SARIMA models, while the full-time series was investigated using an intervention analysis. The different methods were compared by considering their forecast accuracy.

In the second project, a statistical analysis of first-year academic performance in the module Theory of Interest was conducted. The aims of this project were to analyse which variables could potentially influence academic performance and to build a model that can be used to predict a student's class mark and final mark. Statistical modelling techniques such as multiple linear regression, decision trees, bagging and random forests were fitted to the data.

The third project performed a time series analysis on wind data in order to create a warning system for wind turbines. The automated time series function `auto.arima` available in the R-software forecast package was implemented to achieve this objective.

Tuesday 9 October 2018 (Financial Risk Management)

Chair: Mr CJ van der Merwe

During the first Financial Risk Management session, five groups presented their work. A wide variety of topics was covered, all applicable to quantitative finance.



Financial Risk Management honours students

The first group presented methods of estimating a floor for the values cryptocurrencies. Their presentation started by explaining the core mechanics of cryptocurrencies after which they showed how they expanded on current research within the field by applying it to altcoins.

The second group presented on style diversification in portfolio management and showed how, during certain financial cycles, certain investments styles would outperform others.

The following group showed how they created an easily understood method of how to visualise multidimensional financial data through biplots.

The fourth group compared different portfolio optimisation methods with the aim of determining strategic asset-allocation models that improve upon the portfolio optimisation techniques defined under Modern Portfolio Theory.

The final group showed how various models can be applied in the South African context to see if defaults of large institutions can be predicted earlier than traditional probabilities of defaults obtained from third parties.

Thursday 11 October 2018 (Statistics and Mathematical Statistics)

Chair: Prof S Lubbe

Three project teams presented their work on Data Science problems presented by Capitec Bank. The work centred around binary classification – either to predict credit card uptake or credit risk for loan applicants with limited credit history. All students agreed that the practical application of their theoretical knowledge to a “real-world” problem was an eye opener. Specifically, the amount of effort and time needed for data preparation was reiterated repeatedly.

The methods applied ranged from logistic regression with lasso-type penalties to random forests and gradient boosting descent. Each group managed to provide a model which significantly improves classification for informed decision making. Both the Department of Statistics and Actuarial Science and Capitec Bank found the collaboration mutually beneficial and we are pleased to say that the collaboration will become a regular feature of our honours programme.

Thursday 11 October 2018 (Financial Risk Management)

Chair: Prof WJ Conradie

In the second session of the Financial Risk Management presentations, four groups delivered their talks.

Two of the groups investigated whether derivatives traded on the JSE satisfy the theoretical no-arbitrage pricing formulas found in literature. In the one study it was found that the market prices of a number of futures follow theoretical pricing formulas in a narrow band and if transaction cost is taken into account arbitrage opportunities do not exist. In the second study a number of options traded on the JSE was considered and it was found the market prices of these option prices closely match the theoretical option Black-Scholes-Merton and Binomial tree pricing theory. However, the choice of the volatility model has a considerable impact on estimating the values of the options and the challenge is to use the most appropriate volatility model.

The next group researched the ability of South African equity managers to time their sales, specifically the opportunity cost of removing a company that might have performed well in the future versus the stocks they then bought into. They found that South African managers, on average, generally did buy stocks that outperformed the stocks

they sold over the past 10 years, but that they struggled in some calendar years that had a lot of price volatility and political uncertainty.

The last group to present built various “Monkey Funds” (A term coined by Malkiel), testing whether portfolios that were randomly constructed could outperform a market index after costs. The benchmark cognisant semi-active strategies performed the worst due to costs, and the funds that took completely random positions with infrequent rebalancing had the highest likelihood of outperforming the market index.

Friday 12 October 2018 (Statistics and Mathematical Statistics)

Chair: Dr M Lamont

Three projects were presented in this session with the main themes as follows:

In the first presentation students presented work on using a logistic regression model and ensemble models (bagging, random forest and boosting) to model climate data. The second presentation focused on using penalised linear discriminant analysis, which is an extension of Fisher’s linear discriminant analysis, to analyse high-dimensional microarray data. The last presentation of this session investigated the use of parametric models such as the Gompertz-Makeham and Helligman-Pollard models as well as the Cox model in a mortality analysis.

The actuarial students also worked hard on their projects during the year, and Mr Stephen Burgess provided a brief overview below:

Every year, Actuarial staff and volunteers from industry supervise around 20 Actuarial honours research projects. Student projects cover a wide range of topics. This year topics ranged from mortality analyses and projections, investigations into the spending patterns of retirees, optimal investment strategies in retirement to analyses of trends in the cost of breast cancer treatments. This provides students with a valuable opportunity to apply the knowledge that they have built up during the undergraduate degree to real-life problems.

We are proud of the quality of these projects. For example, the Financial Services Board used insights from a project completed by a student in 2013 when they developed a new solvency regime for the financial services industry. This project, as well as projects completed by students in 2012 and 2017, received the Actuarial Society of South Africa’s prize for the best honours project at a South African university.



SU student receives ASSA prize for best honours project in 2017

Every year, the Actuarial Society of South Africa awards a prize to the best honours project at a South African university. The 2017 prize was awarded to a Stellenbosch University student, Rayno Mostert, for his paper entitled: “Calibrating the Merton Jump Diffusion Stochastic Process using Artificial Neural Networks”.

Actuarial practitioners are challenged with the problem of calibrating stochastic processes to real-world data sets. Rayno’s project looked at the use of artificial neural networks (ANNs) as an alternative method to calibrate a stochastic process. Rayno conducted a simulation study on the Merton Jump-Diffusion process and compared the performance of ANN models to traditional calibration methods such as maximum likelihood estimation and generalised method of moments. His results indicate that the ANN architecture was able to yield acceptable parameter estimates, within realistic parameter bounds.

MEET AN ALUMNUS

Mr Lusani Mulaudzi: Views on the future of the SA actuarial profession

Mr Lusani Mulaudzi obtained a BCom (Hons) degree and postgraduate diploma in Actuarial Science from Stellenbosch University and qualified as an actuary in 2012. He currently heads up his own actuarial consulting company. In 2017, he was elected as the president-elect of the Actuarial Society of South Africa and he will lead the South African actuarial profession in 2020/2021. In this article, Lusani tells us about his family, career and vision for the actuarial profession.

Tell us something about yourself and your family.

I was born and raised in Limpopo in a village called Ha-Mashamba. I have two older brothers and two younger sisters. My parents are both teachers, but my father retired four years ago. I've been married for 11 years and have three boys. I am involved in community work and serve as a pastor of a small congregation in Delft. I am passionate about education and development.

Why did you choose to study at SU?

I came to Stellenbosch because I was attracted by a BA (Value and Policy Studies) course that was offered only by Stellenbosch University. Actuarial Science was my second option. A counselling psychologist convinced me that it would be better to do Actuarial Science given my parents' views and other factors such as funding opportunities. My knowledge of Actuarial Science was very limited at that point in time.

Tell us something about your career.

I started off as an actuarial consultant at Sanlam for four years and moved on to Medscheme and worked as a health actuary for six years. I was responsible for pricing, product design and risk management for a number of medical schemes including Fedhealth Medical Scheme. In 2017, I worked in Johannesburg as a CEO of a small health administrator and managed care organisation. I founded a consulting company last year and I am still going through the birth pains.

What are the main challenges of your current role?

The main challenge that I face is to make a meaningful impact in what I do although some of the activities that can achieve this do not pay immediately. My challenge is to maintain a good balance between profit-making activities and non-profit-making activities.



What skills developed through your actuarial qualification have you found particularly valuable in your career?

Stellenbosch University allowed me the freedom to think and work independently, but I always had the support of classmates as well as lecturers who were more than willing to go the extra mile. Actuarial Science is technically very rigorous, and I battled a lot in my third and honours years. The discipline and professionalism amongst lecturers at Stellenbosch University were excellent and due to that very little time in all my academic years at the university was wasted. I had very little computer experience when I came to Stellenbosch University, but I left with a level of confidence in this regard. The additional courses that I did after my honours year helped me to qualify as an actuary. In particular, I thoroughly enjoyed the Health fellowship course that was offered and presented by top health actuarial practitioners such as Shivani Ranchod, Heather McLeod and Paul la Cock.



What do you think are the most important characteristics that a prospective actuarial student should possess if s/he wants to pursue a career in Actuarial Science?

Prof Slattery presented a paper while I was at Stellenbosch University entitled "Adapt or Die", with reference to the actuarial profession. Although the issues that he raised in that paper are no longer as applicable, the warning is still relevant today. Actuarial Science makes use of whatever quantitative and qualitative methods are available to give sound and authoritative advice to planners, especially within the financial services sector. We have now reached a juncture where it is clear that this skill set needs to be applied more widely, including in non-financial sectors. Actuaries have been involved in demographic modelling since its early days as well as in pensions and life insurance. They then branched out into general insurance, investments, health insurance, enterprise risk management and lately, banking. At the most recent convention of the Actuarial Society of South Africa, there was an increase in the number of topics covering artificial intelligence, data science and public policy. There was a strong sense that we need to modernise our toolkit and use it to help solve some of the biggest public policy issues facing our country. Actuaries have demonstrated their ability to adapt and the best paper at the convention on neural networks served to illustrate this point. The profession will continue to identify and 'capture' appropriate tools into its evolving toolkit.

What role can a professional organisation like the Actuarial Society play in developing the SA economy and/or society?

In my opinion, the biggest challenge facing the profession is our ability to be relevant and to serve the public interest in South Africa. In the past the profession tended to be more of a private sector discipline. Given the scope and nature of the decisions made in the public sector, it makes sense that the actuarial profession should be a lot more involved in assisting the politicians and public officials to better understand the future impact of their decisions and the need

to make the best possible decisions. The actuarial profession needs to continue to transform its demographics whilst at the same time maintaining high standards of actuarial education.

Is Data Science more relevant than Actuarial Science?

I view Data Science as a perfect example of a modern tool that actuaries should 'capture'. Actuaries have a much wider responsibility in financial services organisations such as risk management, product design, pricing, reserving and strategy development, etc. All these functions require insights that can be drawn from available data and therefore require data scientists. It might be argued that actuaries in future may need to become data scientists as part of their professional development journey in order to continue to add value in their organisations. The emphasis on professionalism and continuous professional development will continue to make the actuarial profession one of the most valued qualifications. This can only happen if actuaries continuously adapt and find relevant areas of practice and set high standards in those areas.

It is a great privilege to celebrate and showcase our alumni. As an alumnus/a of Stellenbosch University, you are our most valuable stakeholder and ambassador. You form part of a global community of more than 120 000 graduates. Your involvement with us ensures that you are kept abreast of developments here, that you receive a range of opportunities to remain connected to other alumni and that your degree and alma mater remain relevant. Contact alumni@sun.ac.za

UPCOMING SEMINARS

Seminar Programme: First Semester 2019

Stellenbosch University - Department of Statistics and Actuarial Science

8 February	Peter Filzmoser (Vienna University of Technology, Austria) - Robust and sparse classification in high dimensions
22 February	Adriaan Rowan (Analytics consultant, Cape Town) - Using and understanding non-linear predictive models
8 March	Etienne Roussouw (Munich RE, Cape Town) - The rapidly developing world of (re)insurance
12 April	Piet Maree (Discovery Health, Johannesburg) - Incentives, physical activity and absenteeism: investigating the impact of Vitality on employee wellbeing and how an Apple Watch can prevent absenteeism
26 April	Mark Nasila (FNB, Johannesburg) - Why Statisticians are key in harnessing the 'Fourth Industrial Revolution'
10 May	Loamie Kotze (Isimo Health, Cape Town) - Markov modelling of disease progression in the presence of missing covariates

Lectures start at 13:00 and are held in room 2048 of the Van der Sterr Building, c/o Victoria and Bosman streets, Stellenbosch.

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The first CARME conference in Africa

The Multivariate Data Analysis Group of the South African Statistical Association will be hosting the first Correspondence Analysis and Related Methods (CARME) conference outside Europe, from 4 to 6 February 2019, Stellenbosch, South Africa.



This is a popular series of conferences held every four years. It started in 1991 in Cologne and the previous conference was in Naples in 2015. The conference has attracted 100-200 participants each time and has led to four edited volumes of books and two special journal issues. Please visit our website for more information: <https://carmesa2019.wixsite.com/conference>.

We cast the net relating to "related methods" quite wide, including all branches of multivariate analysis, compositional data analysis, analysis and modelling of categorical data, cluster analysis, multivariate data visualisation, "big data" applications, and more. Applications are welcome and usually cover a wide spectrum of fields: sociology, finance, food research, ecology, marketing, psychology, education, linguistics, archaeology, etc.

We hope you enjoyed this edition of the Department of Statistics and Actuarial Science's biannual newsletter. To access all our past newsletters and departmental information visit our website: <http://www.sun.ac.za/statistics>.



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The next newsletter will be distributed in July 2019.