

# SAMSA e-bulletin

Your newsletter promoting research and mentoring of academics in Southern Africa



## Issue 2 2019

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### Message from the SAMSA President

Dear SAMSA members,

Welcome to the second edition of the SAMSA Newsletter in 2019. We continue to update you on Mathematical Sciences related activities happening in the region. In this edition, we are pleased to share with you stories on achievements of members of the SAMSA family. We also give you a sneak peek into Blantyre, the host city of the 2019 Masamu Advanced Study Institute (MASI) and Workshops that will be held from November 22-December 1 in conjunction with the 2019 SAMSA Annual Conference which will run from 25 – 28 November. Program updates about the SAMSA conference will be communicated via the SAMSA website <http://samsa-math.org> and the association's Facebook page. Information on MASI can be found on <http://www.masamu.auburn.edu>. We encourage members of SAMSA to support the development of future Newsletters by contributing articles and news items to the Newsletter editorial team.

Prof Sandile Motsa

### Editorial note

Dear esteemed Readers,

This is the second edition of the 2019 SAMSA Newsletter. In addition to the research updates, we share with you success stories of SAMSA members. Kindly do not hesitate to send us stories about any of your achievements, be it publications so that we can share them. It is our hope and thinking that by promoting and celebrating ourselves could be an impetus to promoting research and mentoring of academics in Southern Africa and the world at large. Remember to follow and like SAMSA on Twitter and Facebook using the links below. Write to the editorial team at: [josephmalinzi1@gmail.com](mailto:josephmalinzi1@gmail.com) and [mdlonwaprec@gmail.com](mailto:mdlonwaprec@gmail.com)

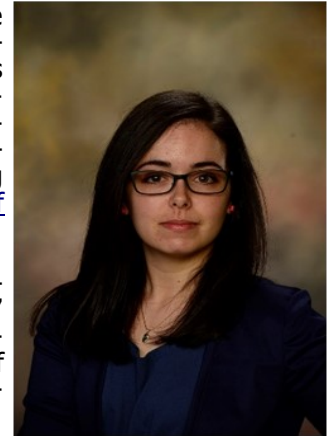


## SAMSA-Masamu Participant Receives Katherine S. McCarter Graduate Student Policy Award

Hannah E. Correia traveled to Washington, D.C. in March to meet with members of the United States (U.S.) Congress. Correia, a Ph.D. candidate under the supervision of Professor F. Stephen Dobson at Auburn University's Department of Biological Sciences, is the recipient of the Katherine S. McCarter Graduate Student Policy Award, which provided her with an unparalleled opportunity to receive policy and communication training while learning about the legislative process and federal science funding. This insight allowed her to discuss the importance of federal funding for the sciences during the Congressional Visit Day organized and sponsored by the [Ecological Society of America](#), the nation's largest community of professional ecologists.

Correia was awarded a National Science Foundation (NSF) Graduate Research Fellowship in 2015 and an NSF Graduate Research Opportunities Worldwide funding in 2017 to pursue collaborative research in Norwegian Institute of Nature Research. Her research focuses on the formulation of novel statistical methods to increase accuracy of quantifying causal relationships and creating models to predict potential ecosystem variations.

Each year she participates in the Masamu Program, a collaborative workshop in southern Africa focusing on advancing mathematical sciences research with students from both the U.S. and Africa. "My participation in the GRFP and Masamu programs are foremost examples of why federal funding is so important and motivates me to obtain experience in communicating the significant positive effects of federal funding on scientific research to policy makers who may not necessarily share my enthusiasm for the areas of science, technology, engineering, and mathematics," said Correia.



Hannah E. Correia



Dr Suzanne Lenhart

### Suzanne Lenhart Co-Author of Award Winning Paper

The paper "Assessing the economic trade-offs between prevention and suppression of forest fires" by Betsy Heines, Suzanne Lenhart, and Charles Sims has been selected as one of the 2019 winners of the Rollie Lamberson Research Award Medal delivered by the Resource Modeling Association (RMA). The paper was published in journal NRM (Natural Resource Modeling). Dr. Lenhart is a senior faculty member of the SAMSA-Masamu Program's mathematical biology research group.

## SAMSA President appointed Dean of Science and Engineering at UNESWA

Dear SAMSA Members,

We are pleased to announce the appointment of SAMSA president, Prof. Sandile Motsa, as the Dean of the Faculty of Science and Engineering at the University of Eswatini (UNESWA), effective February, 01, 2019. Prior to his current appointment, Prof. Sandile Motsa held positions of Head of Department of Mathematics at UNESWA, Associate Professor at University of KwaZulu-Natal (UKZN) and Academic Leader for the Discipline of Mathematics in the School of Mathematics, Statistics and Computer Science at UKZN. Prof. Sandile Motsa has numerous distinctions and achievements and brings a wealth of experience in leadership and administration, research, scholarship, and teaching to his new position. The SAMSA executive will benefit from the leadership and administration skills that Prof. Motsa will acquire in his new role as the Dean of his Faculty. We congratulate him on his much-deserved appointment and wish him continued success.



Prof. Sandile Motsa

SAMSA Vice-President

Dr. Farai Mhlanga

## SAMSA Member Bags PhD in Applied Mathematics

Dr. Milliward Maliyoni was awarded a PhD in Applied Mathematics (Mathematical Biology) by the University of KwaZulu-Natal (UKZN), South Africa on 10<sup>th</sup> April 2019 for his research titled "Stochastic epidemic models for a tick-borne disease: The role of wildlife as reservoirs of tick-borne pathogens". He commenced his doctoral studies in November 2015. According to Dr. Maliyoni, tick-borne diseases (TBDs) have serious health and economic consequences such as causing several diseases to humans, livestock, domestic and wild animals throughout the world.

In his research, Maliyoni investigated the role of randomness on the dynamics of tick-transmitted pathogens and a tick-borne disease, human monocytic ehrlichiosis, with respect to disease extinction and persistence. Applying stochastic epidemic models, in particular continuous-time Markov chain and stochastic differential equations, and the fact that the dynamics of all biological systems are influenced by stochastic forces, his main interest was to establish the effect of stochasticity that is inherent in host-tick interactions on TBD dynamics. It is common knowledge that TBD outbreaks are increasing globally, thereby becoming a threat to public health and economies. These diseases are difficult to manage due to the complex transmission cycle which constantly changes and involves vertebrate hosts. It is for this reason that the knowledge and understanding of the complex interaction between ticks and their hosts is very important for developing and implementing prevention and control measures for TBDs.



Dr. Milliward Maliyoni

Maliyoni's research provided significant insights pertaining to TBD dynamics. These insights also include specific areas that need more attention if efforts to mitigate TBD outbreaks are to be successful. One interesting result he found, which was contrary to his initial opinion that killing ticks guarantees TBD extinction, is that the ticks' hosts which serve as reservoirs for the disease are a major player in TBD dynamics since TBD outbreak is more likely if the disease emerges from infected hosts. In respect of this result, Dr. Maliyoni recommended that any intervention strategies aimed at mitigating or eliminating TBDs must focus more on the infected host population and not the infected ticks. In addition, he found that relevant authorities should ensure that they control or even prohibit host movement between patches, especially during TBD outbreak, which in turn increases the probability of disease extinction. Thus, TBD prevention and control can be achieved by screening infected hosts in protected wildlife reserves and farms before they move to other areas.

Maliyoni said that these findings are particularly beneficial to livestock or deer farmers, wildlife or game park managers, veterinary officials and other stakeholders as they develop, plan and implement strategies aimed at preventing, controlling or eliminating TBDs. In addition, the results of the research will act as a platform for further studies in TBDs using stochastic models. Also, Maliyoni indicated that the findings and models formulated in his study could provide useful information about stochastic models and TBDs to researchers in fields such as mathematical biology, epidemiology, public health, biology, conservation biology, veterinary science, ecology and more.

One of the major obstacles that Dr. Maliyoni encountered during his studies was the shift from his comfort zone of deterministic modelling to stochastic modelling. However, Maliyoni said that this challenge was overcome by the encouragement he got from his supervisor, Dr Faraimunashe Chirove, as well as the ideas he got from a workshop he attended in Pretoria in March 2016. In the course of his studies, he won the second prize for his poster presentation at UKZN's Postgraduate Research and Innovation Symposium in 2016.

Currently, Dr. Maliyoni is back to his country and has assumed his position as a lecturer in Mathematics at the University of Malawi (UNIMA) and continues to do research. Born in 1985, he completed his BSCE (Mathematics and Physics) in 2007 at Mzuzu University, Malawi and his Master's in Mathematical Modelling at the University of Dar es Salaam in Tanzania in 2010.

For his achievement, Dr. Maliyoni owed it to God for guiding and protecting him during his studies. He also acknowledged the tremendous support he got from his supervisors Dr. F. Chirove, Professor Kesh Govinder and Professor Holly. He also thanked UKZN and UNIMA for financial support, his wife Grace Maliyoni, for her invaluable support. Further, he was grateful to his parents Halex and Annie Maliyoni, his siblings, in-laws, workmates and friends for their unconditional support. Dr. Maliyoni is encouraging current and prospective PhD hopefuls to work very hard and apply focus, determination, endurance, independence and commitment to achieve their dreams for there is no sweet without sweat.

*Compiled by Precious and Joseph*

## Data science session at the 2018 SAMSA conference in Botswana

Data Science (DS) has emerged recently as an interdisciplinary area that seeks to gain insights from, increasingly huge amounts of, data using computational methods in a consistent scientific approach. Machine learning is the part of Data Science that make it very popular nowadays. Successes in Machine Learning are evident in many fields including health, drug discovery, banking and finance, agriculture, and education. However, there are no satisfactory theoretical foundations to support the successes of this field. This is where mathematics comes in. The application of existing mathematical tools or where necessary the development of new mathematical tools to provide for the theoretical foundations of Data Science / Machine Learning is highly needed. In addition, numerical and scientific computing methods developed by the applied and computational mathematics community will be very useful in helping address the computational challenges of huge and high dimensional data. Thus the potential contribution of the pure mathematics, and applied and computational mathematics research communities in Data Science research. Hence the need for discussions and presentations of such research in mathematics conferences like SAMSA.

History was therefore made by holding the first ever Data Science session in a SAMSA conference, held at the SAMSA 2018 conference in Palapye, Botswana. This session was organised by Dr. Bubacarr Bah, the German Chair of Mathematics with specialization in Data Science, at the African Institute for Mathematical Sciences (AIMS) South Africa. His Chair's funding from the German Ministry of research (BMBF) administered by the Alexander von Humboldt Foundation (AvH) covered the registration and travel cost of over 90% of the participants of this event. This maiden session attracted 11 presentations (8 students, 3 established researchers) of different African nationalities but all doing their research in Southern Africa (SADC). The talks varied including applications, computing / algorithms, and mathematical theory of Data Science. The goal was to create awareness about, and to build a network of researchers in, this emerging research area within the African mathematics community. Although SAMSA's membership is dominated by SADC mathematicians, a significant amount of African mathematicians outside the SADC attend this conference. As the first session on Data Science in SAMSA, the organisers and the participants feel this event was a very big success. The plan is to hold Data Science session in all SAMSA conferences henceforth.



**Delegates who participated in the Data Science Session at the 2018 SAMSA Conference**

Compiled by Dr. Bubacarr Bah  
German Research Chair of Mathematics with Specialization in Data Science  
African Institute for Mathematical Sciences (AIMS) South Africa

## About Blantyre City, Malawi

Blantyre, located in southern region of Malawi, is the second largest city after the Capital city Lilongwe. It is a city that boasts a rich history and picturesque landscape owing to the four hills that surround it. Actually, it is named after Blantyre in Scotland due to the striking common features that the two cities have.

Blantyre City is accessible from all corners of Africa and beyond through Chileka International Airport which is some 13 kilometers from Blantyre CBD. Malawian Airlines, Ethiopian Airlines, South African Airlines and Kenyan Airways all ply the Chileka International Airport route. Transportation within the City is through a road network and modes of transportation range from private cars (including taxis) to minibuses. A walk in the streets of Blantyre is normally safe between 5:30 AM and 7:30 PM and cases of muggings are rare as long as one avoids the dark alleys and walking alone.

There are many hotels and lodges in Blantyre city and accommodation charges are generally fair and those looking for budget accommodation will find many alternatives without shedding a tear. For those looking for luxury accommodation, Amarylilis hotel in down town Blantyre is the place to consider. It is new and has facilities that offer expansive views of Blantyre. Mount Soche Hotel, Crossroads Hotel and Ryalls Hotel are also places where you can find excellent facilities. These hotels are within walking distance of each other. There are many attractions to visit in Blantyre. One could pay a visit to the National Museum, Mandala house, Michiru nature sanctuary and St Michaels and All Angels Church within the City. A visitor could also try other places within 100 kilometers of Blantyre city. For example, tea plantations in Thyolo, the bottomless pool Dziwe- lankhalamba, the beautiful Mulanje massif, Queen's view and Emperor's view on Zomba mountain, Majete wildlife reserve and Game Haven Lodge.



**Amarylilis Hotel in Blantyre, Malawi**

Malawi is not called *the warm heart of Africa* for nothing. Your stay in Blantyre will be made unforgettable by the friendly and ever-smiling Malawians who will make sure that you think of Malawi as that home away from home.

*Compiled by Kondwani Magamba  
Member of the SAMSA executive and LOC -2019 SAMSA Conference*

## UNESWA Bids to Host 2021 SAMSA Conference

The University of Eswatini has bid to host the 2021 SAMSA conference. The university is located in the Kingdom of Eswatini-a country sandwiched by South Africa and Mozambique. The university of Eswatini was established by act of parliament in 1982. It developed from the University of Botswana, Lesotho and Swaziland, formerly known as the University of Basutoland, Bechuanaland and Swaziland, which was established in 1964. Preparations have already begun at the department of mathematics to ensure that all goes well. Be rest assured to have a comfortable stay in a serene environment surrounded with mountains. Miss not, to as well experience, the Swazi culture.

Compiled By Dr. Joseph Malinzi

### *Message from the treasurer's desk*

SAMSA is an organisation which is devoted to promote cooperation and exchange of ideas in mathematical sciences research and teaching of mathematical sciences and to stimulate communication between mathematical scientists in the region and beyond. We believe you share this vision with us and your membership is important to the advancement of this goal. Join SAMSA today and be part of the many exciting programs and benefits associated with being a member in 2019. The subscription for new members in 2019 is as follows: students, **USD10**, staff, **USD20** and institutions, **USD240**. Please contact Dr Farai Chirove (SAMSA treasurer) on [chirovef@ukzn.ac.za](mailto:chirovef@ukzn.ac.za) to subscribe. To know more about the member benefits, visit <http://samsa-math.org/home-2/membership/>

### **Research and conference funding**

- ◆ AMMSI POSTGRADUATE SCHOLARSHIPS: 2019: <http://www.ammsi.africa/news/ammsi-postgraduate-scholarships-2019>

## **Upcoming Conferences /Workshops/ Summer Schools**

SOUTHERN AFRICAN MATHEMATICAL SCIENCES ASSOCIATION

2019 CONFERENCE

*Mathematical Sciences: A catalyst for Sustainable Development*

November 25-28, 2019  
Blantyre, Malawi

Further information [click here](#)



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# Twelfth Annual Workshop and Conference on Computational Mathematics (WOCCOM2019)

Hosted by:



School of Mathematics, Statistics and Computer Science, Pietermaritzburg

July 1 – 5, 2019

Email: [wocom2019@gmail.com](mailto:wocom2019@gmail.com)

## Conference Chairs

- Prof. Precious Sibanda
- Prof. Sandile S. Motsa

### Local Organizing Committee

- Prof. Precious Sibanda: [SibandaP@ukzn.ac.za](mailto:SibandaP@ukzn.ac.za)
- Prof. Sandile S. Motsa: [sandilemotsa@gmail.com](mailto:sandilemotsa@gmail.com)
- Mrs Hloniphile Mthethwa: [sitholeh@ukzn.ac.za](mailto:sitholeh@ukzn.ac.za)
- Dr. Sicelo P. Goqo: [goqos@ukzn.ac.za](mailto:goqos@ukzn.ac.za)
- Dr. Vusi M. Magagula: [gutiwa@gmail.com](mailto:gutiwa@gmail.com)

### Scientific Committee

- Dr. Faraimunashe Chirove
- Dr. Zodwa Makukula
- Dr. Olumuyiwa Otegbeye
- Dr. Gerald T. Marewo
- Dr. Hiranmoy Mondal
- Dr. Lazarus Rundora
- Dr. Farai Mhlanga

## Registration Fee

# R450.00

Registration Deadline: 21 June 2019

Abstract Submission Deadline: 31 May 2019

31/05/19

21/06/19

July 1 -5,  
2019

**1-3 July: Annual Workshop on Numerical Methods**  
**4-5 July: Conference presentations**

## Themes

- Numerical Analysis,
- Fluid Dynamics,
- Mathematical Biology,
- Financial Mathematics,
- Data Science,
- Computational Mathematics
- Mathematical Modeling



# Strathmore International Mathematics Conference (SIMC 2019)

Theme: "Promoting Challenge-Driven Research in Mathematical Sciences & Building Collaborative Research Networks"

**Date: August 12th - 16th, 2019**  
**Venue: Strathmore University**

### Conference Strands

- Pure Mathematics
- Bio-mathematical Modeling
- Mathematical Finance & Economics
- Statistical Modeling
- Data Science and Computational Intelligence
- Mathematics Education

### General Information

Detailed and up to date information is available on the conference website,

<http://www.strathmore.edu/simc2019/> or  
<https://easychair.org/cfp/SIMC2019>

### Important Dates & Deadlines

- Pre-registration and abstract submission open
- Deadline for submission of abstracts; **31st May 2019**
- Deadline for submission of full papers for publication; **June 30<sup>th</sup>, 2019**
- Conference dates; **August 12<sup>th</sup>-16<sup>th</sup> 2019**



**Strathmore University**

*Institute of Mathematical Sciences*

**Contact Persons:** Dr. Rachel Mbogo - rmbogo@strathmore.edu / Racheal Aketch-Ngui - raketch@strathmore.edu



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## International Conference on Mathematical Sciences and Applications

**VENUE:** Saint George Hotel, Pretoria, South Africa

**CONFERENCE DATE:** 25 to 27 September 2019

**Theme:** Abstract Mathematics and Mathematical Modelling with Applications

**About the conference:** The conference is aimed at creating new partnerships and enhancing current collaborations

### Topics (TAAG):

- Topology
- Algebra
- Analysis
- Geometry

### Topics (Modelling, Applications and Approximation Theory):

- Astrophysics, Cosmology and General Relativity
- Approximation Theory
- Differential Equations, Symmetry Methods, Lie Algebra
- Fractional Calculus
- Epidemiology and Biomathematics
- Financial Mathematics
- Fluid Dynamics
- Mathematical Modelling, Applications and Analysis
- Numerical Analysis

### Important Dates:

**Student Support:** 15 June 2019

**Abstract Submission:** 20 July 2019

**Registration Deadline:** 31 August 2019

**Paper Submission:** 31 October 2019 (TBC)

**Conference Website:** [www.unisa.ac.za/ICMSA](http://www.unisa.ac.za/ICMSA)

For more information about the ICMSA 2019 conference, abstract submission, registration and call for papers visit the ICMSA 2019 website: [www.unisa.ac.za/ICMSA](http://www.unisa.ac.za/ICMSA) or click [here](#) to download the pdf version

Register on <https://forms.gle/q7KbwCYLzKCRZNp6>

### Contact details:

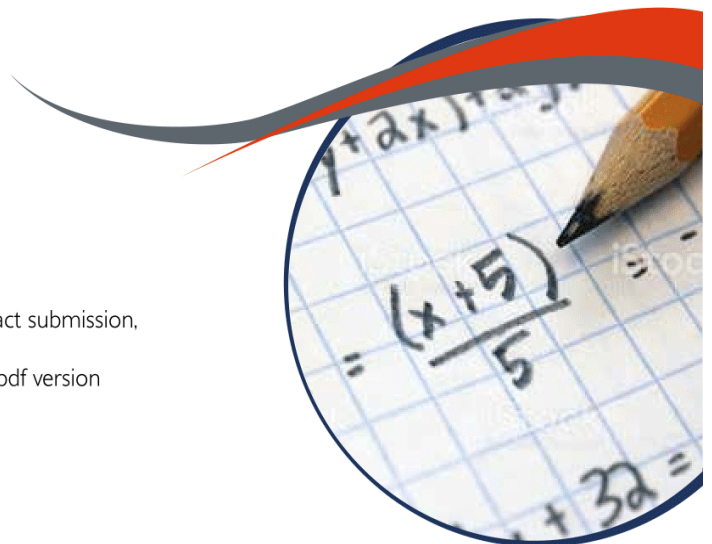
**Prof T Dube** (Conference chair)

**Email address:** [Dubeta@unisa.ac.za](mailto:Dubeta@unisa.ac.za)

**Dr JMW Munganga** (local chair)

**Email address:** [Mungajmw@unisa.ac.za](mailto:Mungajmw@unisa.ac.za)

**General email address:** [ICMSA-2019@unisa.ac.za](mailto:ICMSA-2019@unisa.ac.za)



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# 5

## CIMPA Research School

### Functional Analysis and Applications

A CIMPA research school on “Functional Analysis and Applications” will be held from January 13, 2020 to January 24, 2020 at the University of the Witwatersrand, Johannesburg, South Africa. It is open to MSc and PhD students, postgraduate fellows as well as to early researchers, from institutions in South Africa and in SADEC countries, interested in the fields of Functional Analysis. Participants can apply at [cimpa.wits.ac.za](http://cimpa.wits.ac.za). The application deadline is on October 13, 2019.

Since the number of participants is limited, a selection will be made by CIMPA based on the quality of the applications and the suitability of applicants with the subject and the level of the school. Applicants will be notified on the outcome of their applications as soon as the selection process is complete.

Accommodation and meals of participants will be provided and paid for by the school. In addition, transport costs not beyond 600€ will be reimbursed to the participants who will be selected by CIMPA. Visa fees can also be covered.

