

NEWSLETTER

2017 | Issue 3



➤ **Professor Masupe appointed BITRI CEO**

➤ *Minister Madigele officially opens the BITRI CMS*

➤ **Prof Torto appointed AAS Executive Director**

Dr Dintwe and Dr Okin Undertake 'Soil Organic Carbon in Savannas Decreases with Anthropogenic Climate Change' Study

CEO'S FOREWORD



Botswana Institute for Technology Research and Innovation (BITRI) joins the rest of the country in celebrating the 51st Botswana Independence anniversary. We collectively celebrate the immense achievement our country has achieved in terms of infrastructure development, human capital, services, key economic indicators and the general improvement of quality of life enjoyed by the citizenry and residents of our beautiful Botswana.

At BITRI, our work is driven by engaging with stakeholders to create and deliver innovative solutions, hence we take heart in discussions with them and always endeavor to go an extra mile to deliver on our Mandate, which is "...to identify, develop and/or adapt appropriate technology solutions that provide sustainable innovative solutions through co-creation and collaboration in line with national priorities and needs of Botswana." As such, we engage with stakeholders in order to come up with solutions that address specific and relevant solutions, hence, contributing towards the development of the country.

Most of our work is borne out of collaboration either through research and the relevant foot work and our tentacles extend beyond similar institutes and includes specific industries that

contribute towards the economy such as mining and agriculture. BITRI continues to lead the way on matters of innovation on pressing issues such as climate change, energy, e-education and materials fabrication amongst others.

In July, the Minister of Tertiary Education Research Science and Technology Dr Alfred Madigale officially open the BITRI Centre for Material Science.

The CMS boasts some of the state-of-art instruments, and with this facility, BITRI has ambitious goals to become a significant player in the international research arena in materials production and characterisation.

We are happy to announce that Botswana is to host the 9th International Conference of the Africa Materials Research Society from 11 – 14 December 2017, at the Gaborone International Conference Centre, Gaborone.

This conference will also serve as platform for BITRI to demonstrate the capabilities of the CMS.

9th International Conference of the Africa Materials Research Society from 11 – 14 December 2017, The theme for the conference is "Addressing Africa's Challenges through Materials Development"

The theme for the conference is "Addressing Africa's Challenges through Materials Development" and it will create a platform for collaboration in order to promote the focusing of research on the materials field. BITRI in collaboration with local and international stakeholders have seen it fit to host an event of this magnitude and welcome more than five hundred academics, leaders of industry,

students and policy makers to our country. Interested parties may register for the Conference on the AMRS website and be part of the important conversations that will shape the future of Botswana and Africa in the Materials realms.

BITRI bade farewell to its founding CEO, Professor Nelson Torto. Prof Torto oversaw key processes such as the recruitment of key staff, identification, finalisation of the research focus areas, as well as aligning organisational goals, and resourcing the organization to best fulfill its Mandate. Prof Torto was appointed Executive Director of the African Academy of Sciences.

BITRI continues to fortify its skills base and create a diverse team in which all staff across the different professions contribute meaningfully, and in turn reach their personal aspirations and those of stakeholders, who very much trust the organization to deliver Technology Solutions for them. Meaningful and impactful research takes time, and we will endeavor to keep you informed on the milestones and breakthroughs that the organization and its stakeholders accomplish.

We invite you to engage with this edition as we are busy working on the next edition in which we will share some of the key findings of the research projects the organization has been embarking on.





Professor Shedden Masupe

appointed BITRI

Chief Executive Officer

Prof Shedden Masupe has been appointed Chief Executive Officer of the Botswana Institute for Technology Research and Innovation (BITRI) with effect from 1st October 2017. Prof Masupe joined BITRI in 2014 as Executive Director – Technologies from BIUST.

Prof Masupe is a highly driven and experienced executive with a sound track record acquired over 20 years leading academic and research teams towards fulfilment of corporate strategy objectives and organizational mandates and he also possesses strong competencies in the areas of Project Management, Research Leadership and other Support Services. Masupe is a versatile ICT professional who has the ability to impact an organization through Cultural Change and Enterprise Architecture. His leadership pedigree is evidenced by strategic level participation in a number of executive committees of reputable technology and academic organizations such as BoFiNet, BUAN and UB. He has provided mentorship to professionals in the ICT field, lead research and teaching activities at UB as Head of Department of Electrical Engineering Department as well as Associate Dean of College of Engineering at BIUST.

As Executive Director – Technologies, Prof Masupe's responsibilities included leading, managing, directing, coordinating and supervising all research and development undertaken by BITRI in the areas of Information Systems & Technologies, Energy, and Electronics & Communications as well as directing the support functions of Information & Technology and Design Divisions.

Prof Masupe graduated with a BSc in Mathematics and Physics from Mount Allison University, Canada, and a BSc Eng.,



Prof Shedden Masupe

Masupe is a versatile ICT professional who has the ability to impact an organization through Cultural Change and Enterprise Architecture.

Electrical Engineering (Communications and Fields) from University of New Brunswick, Canada. He also has an MSc in Electronics Engineering (Digital Systems) from Cardiff University, and a PhD in Electronics Engineering attained from Edinburgh University in the United Kingdom.

Prof Masupe takes over from the founding Chief Executive Officer, Prof Nelson Torto, who has been appointed Executive Director of the African Academy of Sciences with effect from 14 August 2017.



The Centre for Material Science was officially opened by
The Minister of Tertiary Education, Research, Science
and Technology

Hon. Dr. Alfred Rabashemi Madigele, MP.
MB. BCh. BAO (Republic of Ireland)
On 13th July 2017

Minister Madigele officially opens the BITRI Centre for Material Science

The Minister of Tertiary Education Research Science and Technology Dr Alfred Madigele officially opened the Centre for Material Science on Thursday 13th July 2017. In his remarks prior to the official opening the Minister emphasizes that BITRI has taken its mandate seriously by kick-starting initiatives to address some of the burning issues facing this country. He said the fact that in just under 4 years since BITRI was established it has achieved so much is a sign of sheer determination, dedication and hard work.

“What is more impressive is that the CMS was a brainchild of our very own Batswana Scientists who started from scratch by demarcating what used to be office space, identified equipment and gases to be installed to make the CMS functional. I am also fully aware that BITRI has used the facility productively to come with several research products relating to; point of use water filtration/treatment, in vivo or implantable sensors, air filtration material, nano-metals production as well as protective clothing that are at different

levels of development or prototyping. BITRI like many research organisations is protective of its research endeavours, (you lose your competitive edge if you disclose details of your research focus) hence today, we will freely talk about the research infrastructure.

The CMS will also assist the country to market itself as it makes strides in research and development

I am informed that CMS boast some of the state of art instruments such as a Carl Zeiss High Resolution Electron Microscope, a Kratos X-ray Photoelectron Spectroscopy system and a Walters High Resolution Liquid Chromatography Mass Spectrometer. The Electron Microscope can operate in both scanning and transmission mode to detect objects 75 000 times thinner than the human hair. This is how powerful this instrument at the CMS is. The mass spectrometers at the Centre are of the same calibre as those used by the International Association of Athletics Federation (IAAF) to detect drugs used by athletes. One of the X-ray equipment can be used to analyse

teeth, bones, and medical implants. On this note, I would like to invite you to join me in congratulating BITRI on a job well done”.

The Minister said most of the services that will be availed through the CMS would ordinarily be sourced outside Botswana, often at very high costs because of a lack of such a facility. “The CMS will also assist the country to market itself as it makes strides in research and development. With its state-of-the-art world class facilities, sound expertise and firm commitment to investing in research, BITRI has ambitious goals to become a significant player in the international research arena in materials production and characterisation. BITRI is proud to introduce this unique Centre focused on advancing industry-relevant research, as well as preparing students to thrive in educational, research and industry environments. This Centre embodies many of the things we must do to be as relevant as possible for the country, industry, students, researchers and industries. The Centre will develop materials for a wide range

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RSTI Advisory Committee Launched

On Tuesday 8th August, BITRI together with other stakeholders convened at the BITRI Boardroom to launch the Research, Science, Technology and Innovation Advisory Committee (RSTI Advisory Committee). The Committee was established to coordinate the implementation of the Research, Science, Technology and Innovation Policy which provides a platform for the transformation of Botswana into a knowledge-based society.

Speaking at the launch, the Minister of Tertiary Education, Research, Science and Technology (MOTE) Dr Alfred Madigele said the Committee would guide and advise government on global trends on integration, comparative advantage and market demands in setting up a national research, science and technological priorities for efficient use of limited resources.

“The country is striving to diversify its economy from reliance on minerals, especially diamonds. We remain indebted as a country to our natural resources’ contribution to our initial economic growth. However, time is ripe for discovery of new sources of revenue with a clear conscious mind that natural resources are not forever,” emphasized Dr Madigele.

The Terms of Reference of the Committee include but are not limited to providing strategic advice to the Minister of



Minister of Tertiary Education, Research, Science and Technology (MOTE) Dr Alfred Madigele

Tertiary Education, Research, Science and Technology on the development, implementation and monitoring of the RSTI Policy, advising on national priorities for research and development, guide the national agenda on research, development and innovation and direct implementation of the RSTI Policy to ensure impact and achievement of goals, advising on funding strategies for effective implementation of the research, development and innovation agenda as well as providing guidance on best model for coordination of RSTI in the country.

The minister said the Committee seeks to bring together stakeholders, ranging from the research institutions, funding agencies, and business, civil society to regional and local governments in

making and implementing policies in an effective manner. The membership of the Committee cuts across multiple sectors and includes Ministry of Basic Education, Ministry of Agricultural Development and Food Security, Botswana Institute for Technology Research and Innovation (BITRI), Botswana International University for Science and Technology (BIUST), University of Botswana (UB), National Strategy Office, Botswana Innovation Hub (BIH), National Food Technology Research Centre (NFTRC), Botswana University of Agriculture & Natural Resources (BUAN), Business Botswana, Statistics Botswana, Botswana Harvard Institute, BVI, Geoscience Institute, Okavango Research Institute, as well as two independent professionals appointed by Minister.

The Permanent Secretary MOTE Chairs the Committee, while the Director of the Department of Research, Science and Technology serves as the Committee Secretary. Deputy Permanent Secretaries Research, Science, Technology and Innovation and Policy Development and Research also form part of the Committee.

The MOTE is responsible for policy on student financing, tertiary institutions and coordinating research science and technology development.

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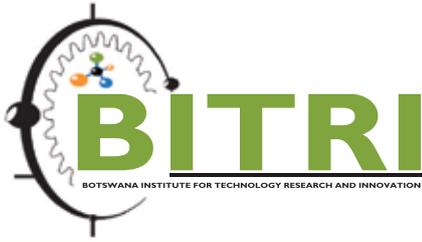
BITRI Centre for Material Science

of applications in areas such as mining, defense, health, environment among others. In addition, the Centre will be dedicated to research and human capital advancement where researchers and students will be given the opportunity to train and analyze their sample for research work. CMS is envisaged to be the laboratory of choice that will boost industry. This, I hope will also put us in good standing for potential collaborations revenue generation and funding,” he said.

For her part, the BITRI Board Chairperson Prof. Sesae Mpuchane reiterated the Minister’s words that BITRI staff had to hit the ground running to set up the facilities as there literally was nothing on the ground. She said the objective of today’s event was to open doors to stakeholders so that they see what there is to offer at BITRI. “We are an institution that closely works with its stakeholders in providing technology solution, therefore, this event is an opportune time to increase awareness about us. We pride ourselves as a people-

centred organization that ensures that the needs of the people of Botswana and Africa are met, hence our philosophy: Technology Solutions from You, to Us, for You”.

Present at the occasion were Ambassadors, Captains of industry, Government senior officials and the representatives of the private sector. Prior to the opening of the CMS the CEO briefed the media on the various projects that BITRI is working on and those that are ready for use.



The BITRI Centre for Material Science

The Botswana Institute for Technology Research and Innovation (BITRI) is a parastatal under Botswana's Ministry of Tertiary Education, Research, Science and Technology, established with a Mandate to identify, develop and/or adapt appropriate technology solutions that provide sustainable innovative solutions through co-creation and collaboration in line with national priorities and needs of Botswana. The technologies will as much as possible maximize the use of local materials to ensure efficiency and affordability.

BITRI has established a world-class Centre for Material Science (CMS) with state of the art laboratory facilities, such as XPS, XRD, XRF, SEM, high resolution GC/MS, LC/MS and ICP/MS. The CMS has synthesis capabilities for metal nano particles, electrospun nano fibres and materials characterisation that will serve the research needs as well as the commercial materials analysis needs of Botswana and Africa across a variety of sectors.

BITRI invites all interested parties to use the facilities for a fee.

For more information, contact Thatayaone Tladi

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TECHNOLOGY SOLUTIONS
FROM YOU
TO US
FOR YOU



1. The high resolution Carl Zeiss Gemini SEM500 Electron microscope is a complete material characterisation instrument, and can perform Electron Backscatter Diffraction and Transmitted Electron imaging (STEM).

2. The Yflow electrospinning unit (PED 1.0.S – 500) comes with single phase injector, multi-needle and coaxial injectors. The system is climate-controlled, with the ability to electrospin at elevated temperatures. A camera inside the chamber enables easy visualisation of the Taylor cone.

3. The Empyrean, PANalytical–X-ray diffractometer (XRD) is used for the analysis of powders, thin films, nanomaterials and solid objects for industrial applications such as soil mineral analysis, cement industry, mining, metal manufacturers and crystal synthesis.



The 9th International Conference of the African Materials Research Society

11–14 December, 2017 • Gaborone, Botswana

INTRODUCTION

The 9th International Conference of the African Materials Research Society will be held at the Gaborone International Conference Center in Gaborone, Botswana, December 11–14, 2017. It will allow the scientific and research communities to build knowledge, foster relationships and promote action for further understanding and collaborations in the broad fields associated with materials science and technology. The overall conference theme will be **“ADDRESSING AFRICA’S CHALLENGES THROUGH MATERIALS DEVELOPMENT”**. Eight symposium themes that constitute the conference reflect both the needs of the global research community, as well as the needs that are specific to Africa with an anticipated attendance of 500 people from around the world.

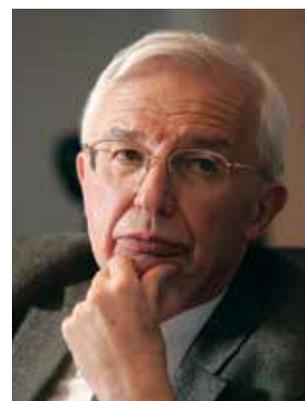
SYMPOSIUM THEMES

- Materials for **Health**
- Materials for **Water**
- Materials for **Agriculture/Environment**
- Materials for **Energy**
- Materials for **Mining/Construction**
- **Nanoscience/Nanotechnology**
- Materials **Education/Networking**
- **Computational Materials Science**

KEYNOTE SPEAKERS

Anne Andrews, USA	Jose Lagaron, Spain	Federico Rosei, Canada
Araya Asfaw, Ethiopia	Malik Maaza, South Africa	Thomas Schulthess, Switzerland
Solomon Assefa, South Africa	Tobin Jay Marks, USA	Nava Setter, Switzerland
Neil Coville, South Africa	Sabelo Mhlanga, South Africa	Winston Wole Soboyejo, USA
Abdelaziz El Jazouli, Morocco	Roberto Morandotti, Canada	Nicholas Spencer, Switzerland
Francis Gudyanga, Zimbabwe	Ange Nzihou, France	Guebre Tessema, USA
Sean Hearne, USA	Kenneth Ozoemena, South Africa	Paul Weiss, USA
Benjamin Hsiao, USA	Neerish Revaprasadu, South Africa	Ying-Wei Yang, China
Francesca Lacopi, Australia	Geraldine Richmond, USA	Meifang Zhu, China

PLENARY SPEAKERS



Jean Marie Lehn
Nobel Laureate Chemistry, 1987



Sossina Haile
2010 AIC Chemical Pioneer Award

PARTNERING ORGANIZATIONS



CONTACTS

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MRS  **CO-SPONSORED MEETING**

amrsbotswana.org

BITRI Bids Farewell to Prof Torto



(Standing) BITRI Board Vice Chairperson, Dr Ecco Maje, Minister Madigele, BITRI Board Chairperson Prof Sesae Mpuchane, Prof Torto, MOTE Permanent Secretary, Dr Theophilus Mooko, BITRI Board Member, Mr Oganeditse Marata. (Seated): BITRI Board Members Dr Ronald Tshelametse, Ms Tekolo Modungwa, and Mr Edwin Elias as well as member of the BITRI Human Resources Committee, Mr David Moloi (far right).



Prof Torto receiving a gift from BITRI Acting CEO, Professor Shedden Masupe



Minister of Tertiary Education, Research, Science and Technology, Dr Alfred Madigele, delivering words of commendation for Prof Torto

Botswana Institute for Technology Research and Innovation held a farewell party for its Founding Chief Executive Officer, Professor Nelson Torto.

During his first year in office, some of the major tasks were recruitment of key staff, identification and finalisation of the research focus areas, as well as aligning organisational goals. Different speakers, amongst them Minister of Tertiary Education, Research, Science and Technology (MOTE), Dr Alfred Madigele, Chairperson of the BITRI Board of Directors, Professor Sesae Mpuchane, and Executive Director - Technologies Prof Shedden Masupe all describe Prof Torto's as an eminent Scientist and visionary leader. Prof Torto holds a BSc (Hons) Chemistry from the University of Manchester Institute

of Science and Technology (UMIST), MSc Chemistry from the University of Botswana and a PhD in Analytical Chemistry from the University of Lund (Sweden).

He started his career as a method development chemist at the BCL Mine in Selebi Phikwe. He joined the University of Botswana's Chemistry Department as a staff development fellow in 1993 and subsequently rose to the rank of Associate Professor. In 2008, Prof Torto joined Rhodes University as a Professor in Analytical Chemistry and subsequently led the Chemistry Department for 3 years.

Prof Torto is a renowned researcher who has received various awards, given invited plenary lectures at international conferences as well as published more

than 120 papers, graduated 19 PhDs and has several registered patents. In 2008, Prof Torto received the Young Investigator Award in Separation Science from the American Chemical Society. He has held various advisory roles nationally, regionally and internationally and is a Fellow of the Royal Society of Chemistry, a Fellow of the African Academy of Sciences as well as an accredited Time to Think Coach and Facilitator.

He was inducted as a Fellow of the Botswana Science Academy (BAS) in 2016 and he is also the Founding Secretary General for the African Network of Analytical Chemists (SEANAC).

AAS Announces of new

Executive Director

The African Academy of Sciences Governing Council has announced the appointment of Prof Nelson Torto, a prolific analytical chemist, as its Executive Director with effect from 14 August 2017.

Torto, who was appointed after a continental search process, replaces Prof Berhanu Abegaz whose two-term contract ended in March. Dr Tom Kariuki, Director of the Alliance for Accelerating Excellence in Science in Africa (AESA) has been Interim Executive Director since the departure of Prof Abegaz.

“This is a befitting appointment,” says AAS President Prof Felix Dapare Dakora. “As an AAS Fellow, Prof Torto has been actively involved in the activities of the Academy, demonstrating his commitment to the organisation and has served in fundraising and various programmes at executive and leadership levels that will be useful to propel the Academy to greater heights.”

Until his appointment at the AAS, Prof Torto was the founding Chief Executive Officer of the Botswana Institute for Technology Research and Innovation (BITRI).

“The Academy is playing a significant role in promoting the development of science, technology and innovation on the continent. I am dedicated to pushing this agenda forward to ensure science adequately plays its role to improve the lives of African people,” Prof Torto said.



About AAS

The AAS is a Pan-African organisation headquartered in Kenya, which aims to drive sustainable development in Africa through science, technology and innovation. It has a tripartite mandate of pursuing excellence by recognising scholars and achievers; providing advisory and think-tank functions for shaping the continent's strategies and policies; and implementing key science, technology and innovation programmes that impact on developmental challenges through the new agenda setting and funding platform, the Alliance for Accelerating Excellence in Science in Africa (AESA). AESA was created by AAS and the NEPAD Agency in partnership with global partners.

The article was originally published on the AAS website, link <https://www.aasciences.ac.ke/updates/news/new-executive-director/>

SA Innovation Summit Platforms Shares Insights on Solutions for the Future



Part of the audience during the opening day of the 2017 SA Innovation Summit.

BITRI attended the SA Innovation Summit on a benchmarking mission with the view to explore the relevance of the Summit to the BITRI organizational strategic intents. The event, held at the Cape Town Stadium, set out a platform for innovators, entrepreneurs, industry players and experts to network, share their expertise, foresights and experiences, unveil their innovations, and discourse on solutions that benefit society.

Following the opening ceremony, breakaway sessions included panel discussions with business leaders, creative master classes, hackathons, inventors demonstrating their prototypes at the Inventors Garage, and startups pitching to a panel of potential investors. Startups and business leaders connected to share advice on how to take an idea to market successfully.

Speakers at this year's event committed to a change that they will enact and give feedback on its outcome over the course of the year, helping to create a greater impact on the economic ecosystem.

"The commitment varied from general collaboration in strengthening the innovation and start-up eco system in South Africa to specific commitments. We are incredibly excited about what the year ahead will bring in terms of measurable



Ms Nkata Seleka of Sleek Foods (Pty) took 3rd position in the NEPAD SANBio #FemBioBiz Acceleration Program Finals. The prize money for the award is R100,000 intended for the expansion of the business and a trip to the internationally renowned SLUSH Conference to be held in Finland later this year.

societal impact. It is events like these that act as an important source of inspiration for many to take a great idea and turn it into something that will change the world," explained Audrey Verhaeghe, chairperson of the Summit. Leaders who publicly commit to making a change through innovation and entrepreneurship will be tracked over the year and will report back on their progress at the next Summit by sharing best practices and what has been achieved.

The common thread amongst other presenters was how data has become important in determining the needs of the market, with applications that help customers make dietary and optimizing training schedules for users being cited.



Rob Stokes, Chairman of the Red & Yellow Creative School of Business during his presentation.

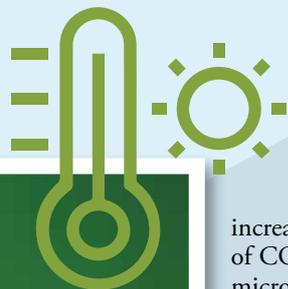
Rob Stokes, the chairperson at Red & Yellow during his talk 'Why creative thinking is the most important skill of the 21st Century', shared an important insight by asserting that "Innovation happens when you ask 'why?'. The crux of his unorthodox presentation was that humans and entrepreneurs in particular, are capable of staying ahead of automation and even artificial intelligence when they access their inner creative genius.

"Processes and tools don't drive creativity; emotion drives creativity," said Mr Stokes.

Other speakers with proof of research on the subject, advised inventors to engage in meaningful conversations with the end users and desist from demographic generalizations that do not realize individuality.

Dr Dintwe and Dr Okin Undertake 'Soil Organic Carbon in Savannas Decreases with Anthropogenic Climate Change' Study

Change' Study



Dr. Kebonye Dintwe, Researcher - Climate Change Science

Dr Dintwe and Dr Okin investigated the response of soil organic carbon (SOC) fluxes to climate change in the Kalahari. The study was undertaken from a context that climate models indicate that climate change is likely to affect carbon (C) cycling in drylands, particularly savannas. However, the models do not quantify nor indicate the magnitude and direction of change. In the study, Dintwe and Okin used the Century model to analyze how soil C sequestration, soil respiration and net primary productivity (NPP) would respond to an increase in atmospheric CO₂ and soil temperature. They also assessed the coupled effects of precipitation and temperature change on C dynamics under future climatic conditions, as well as the decoupled effects of each of the climate variables under three IPCC climate scenarios; historical, RCP2.6 and RCP8.5. The RCP2.6 represent low carbon emission scenario, whereas RCP8.5 represents very high carbon emission scenario.

In their study, Dintwe and Okin calculated the total soil organic carbon (SOC) in the Kalahari savannas to be 0.9 Pg C (1 Pg = 10¹⁵ g) in the top meter. The Kalahari, which is considered to be representative of global savannas in terms

of expected climate change, is likely to become a source of atmospheric CO₂ as climate becomes warmer and drier. It is estimated that the soils in the Kalahari will lose about 10% and 18% SOC in the top one meter under RCP2.6 and RCP8.5, respectively. The rate of SOC loss due to anthropogenic-driven climate change is estimated at -1.1 Tg C yr⁻¹ (1 Tg = 10¹² g) and -2.0 Tg C yr⁻¹ under RCP2.6 and RCP8.5, respectively until the end of this century. If extrapolated to the global extent of savannas, the results imply net SOC loss of at least -28.4 Tg C yr⁻¹ and 64.1 Tg C yr⁻¹ under RCP2.6 and RCP8.5, respectively. The rapid loss of C from dryland soils could accelerate global warming and strengthen positive feedback mechanisms between climate change and processes controlling SOC.

Their results further demonstrated that C fluxes in the Kalahari and similar savannas around the world are likely to be affected by climate change. An increase in soil temperature results in loss of soil organic carbon (SOC), whereas doubling atmospheric CO₂ concentration causes an increase in SOC. The increase in air temperature causes soil respiration to increase, while it causes NPP to decrease. Although an increase in atmospheric CO₂ would enhance plant productivity, particularly C3 plants, soil temperature

increase will likely counteract the effects of CO₂ by enhancing soil C loss through microbial respiration, whereas reduced precipitation will likely to reduced soil C input. Their results indicate that temperature and precipitation have roughly equal contributions to maintaining SOC stocks, and that C fluxes respond to the overall sum of the effect of temperature and precipitation change.

The results vividly support the positive feedback between the SOC and atmospheric C cycles and indicate that these feedbacks are not adequately accounted for in existing Earth System Models (ESM) that are part of Coupled Model Intercomparison Project Phase 5 (CMIP5). Revisions to these ESM would appear necessary to adequately account for this positive feedback. Furthermore, these results call for policymakers to take into account biogeochemical process dealing with climate change issues.

The Climate Change Division at BITRI focuses on understanding the impact of climate change on Botswana's agriculture, water resources and health sectors, such as the risk of droughts, extreme weather events, increasing temperatures, vector-borne disease outbreaks and changes in water availability. This understanding is done through improving climate science and impact assessments, and incorporating the views of local communities and decision-makers on potential adaptation response to climate impacts.



1

BITRI at the Botswana Independence Marathon

On Saturday 23rd September, a team of over sixty BITRI cadres, ranging from Executive Management to staff across different functions, joined a field of over two thousand fitness enthusiasts and professional runners in the second edition of the Botswana Independence Marathon.

The goals of participating in the event were to enhance camaraderie amongst staff, boosting staff morale and wellness as well as generate positive associations between the public and the organisation. Over forty staff members took part in the 10 km race, twelve participated in the 21.1 km, whilst ten took part in the 5 km fun race.

Organised and hosted by Time Shield Events, the marathon was first held in 2016 on the eve of Botswana celebrating her 50 years of independence.

The hashtag for the 2017 event was #UniteRunCelebrate, with a view to add to the celebrations around the Botswana Independence Day at the same time infusing elements of exercise and solidarity.



1. The elated team after competing in the 5km, 10 km and 21 km events.
2. Dr. Segomotso Bagwasi after collecting her 10 km race medal.
3. Desiree Okatswa (left) and Kediemetse Mothibedi (right) at the finish line. Both were participating in the the 10km race for the first time.
4. Mabel Seloka, Goitsemodimo Matsime and Rebaone.
5. Dr Ipe Mavunkal, a veteran of the 42 km full marathon after completing the 21 km with relative ease.
6. The team before their respective races.



Ndebombuya Mokaloba - PhD
Senior Researcher,
Building Material Science Division

Dr Ndebombuya Mokaloba holds a B.Eng. Mechanical Engineering from University of Botswana, B. Honours (Metallurgy) and MSc Chemical Technology from University of Pretoria, and a PhD (Engineering) from the University of Botswana. His academic interests cover Manufacturing, Physical Metallurgy, Polymer Science, Polymer Processing, and Polymer Engineering. His research at PhD was on the Development and Characterization of a Polymer matrix based and Cellulosic-fiber reinforced Composite Material. He has published articles on modification of cellulosic fibers purposed for engineering applications as reinforcement agent in Composite materials. He is trained as a Technical assessor, with extensive experience in the evaluation of engineering materials, with inclination towards the Metallic and the Polymeric, and development of testing methodologies. He has consulted on laboratory-competency establishment and product quality-inspections for government infrastructural development projects.

Dr. Mokaloba is presently engaged in industry-driven investigation and exploitation of the potential of untapped natural raw materials and industrial by-products towards production of building materials and products. He is engaged in the development of technologies for production of building materials, identification of innovative uses for the same materials, and modification of conventional building materials for enhancement of their performance characteristics. His area of engagement

encompass the testing of materials for fitness-for-purpose and development of Testing methodologies for products of innovation. Dr. Mokaloba also engages in the Assessment and Certification of materials and products for performance.

Research Interest: The Science and Engineering of Materials, Development and Characterization of Engineering Composites, Characterization of Metals, Product Conformity Assessment (Quality Assurance), Laboratory Competency-development and Assessment.



Keneilwe Phiri
BEng (Civil), ERB

Associate Researcher - Building Material Science, Keneilwe Phiri is a Civil Engineer with a Bachelor of Engineering (Civil), from the University of Botswana.

Keneilwe worked for a Civil Engineering Consultancy as Junior Assistant Resident Engineer (Pipeline) under the Mmamashia-Kanye North South Carrier Connection Project prior to joining BITRI. Her work included the supervision of the contractor's daily works ensuring compliance to specifications and implementation of quality assurance and quality control.

At BITRI, Keneilwe is a Building Material Science Associate Researcher involved in the Kgalagadi Sand Building Block/Brick Technology and investigation of the potential use of local raw materials for production of refractories.

Her research interests cover green built environment, highway design and pavement rehabilitation.



Kebonye Dintwe - PhD
Researcher - Climate Change Science

Dr Kebonye Dintwe is an ecologist who studies feedbacks between climate change and carbon cycling in dry land ecosystems. Kebonye graduated with a Bachelor's Degree (Biological Science) from the University of Botswana. He received his Master's Degree and PhD from the University of California Los Angeles (UCLA), Department of Geography. His PhD work focused on understanding the impact of climate change on land-atmosphere interactions in global dry land ecosystems. As part of his PhD work, he estimated soil organic carbon (SOC) in the Kalahari basin. Kebonye has recently published a new method to calculate fire-induced albedo change and associated radiative forcing in Sub-Saharan Africa.

At BITRI, Kebonye's research is focused on balancing food security and soil carbon emissions in smallholder farmers using climate smart solutions. His research interests are Carbon Cycling, Soil Respiration, Savanna Ecosystems, Land-Atmosphere Interactions, and Climate Smart Agriculture.

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Isaac N. Beas - PhD
Researcher – Specialty Chemicals

Dr Isaac N. Beas joined BITRI as a Researcher – Specialty Chemicals on 4th July 2017. Before joining BITRI, Dr. Beas was working as a Postdoctoral fellow at the University of South Africa. He acquired a PhD in Chemistry from the University of Johannesburg/University of Witwatersrand (South Africa). He studied for his MSc in Physical and Theoretical Chemistry, BSc (Honors) Applied Chemistry and BSc Physical Sciences at the University of Yaoundé (Cameroon).

At BITRI, Dr Beas is responsible for undertaking research on carbonaceous materials gasification and catalytic conversion of syngas. His research interests include biomass gasification plant, Fischer-Tropsch synthesis; catalysts synthesis; characterization, surface modification, and catalytic application of nanoparticles, particularly encapsulation of nanoparticle and alloy nanoparticles in hollow structures; morphologically or dimensionally controlled preparation, characterization and application of novel carbon nanomaterials; design of carbon-based composite nanostructures and exploring their applications in heterogeneous catalysis, electrochemistry, water treatment, energy conversion or nanoscale electronic devices.

Dr Beas has expertise in surface characterization techniques (STEM, SEM, TGA/DSC, Raman, PXRD, XPS, BET, TPR, TPD/O, XRF, FT-IR, Chemisorption) and analytical techniques (GC-MS, GCxGC-TOFMS, ICP-OES, CHNO/S).



Maatla Moile
IT Support Technician – IT Department

Ms. Maatla Moile has been appointed to the position of IT Support Technician. In this role, provides technical assistance, support and training to end – users and she manages the Operating Microsoft System Centre 2012 Service Manager Service desk.

Maatla graduated with a Bachelor's Degree (Computer Science) from Botho University. Before being appointed in her substantive position, Maatla served as an intern at BITRI and at Department of Building and Engineering Service (DBES), in reverse order. Her work included operation of service desk, Installing and configuring computer operating systems and applications, identifying, evaluating and coming up with solutions to network problems and maintaining Active Directory Users and Computers in windows server 2012 R2. Maatla's other competencies include but are not limited to Windows server 2012 R2, VoIP Telephone Systems, Exchange 2013 Admin Centre and Symantec Endpoint Protection Manager.



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**Pre Conference Workshop
09-10 DEC 2017**

**Main Conference
11-14 Dec 2017**

Abstract submission: 31 March -15 October 2017

Early bird registration: 1 April -15 August 2017

Secure online registration (via MRS): to be closed 13 November 2017

Regular registration: 16 August -13 November 2017

Late/On Site registration: 14 November December - 11 December 2017

The Botswana AMRS2017 will draw participants from around the world, with an anticipated attendance of approximately 500. At its heart, the AMRS series of conferences allows the scientific and research communities to build knowledge, foster relationships and promote action for further understanding and collaborations in the broad fields associated with materials science and technology.

The symposia themes of AMRS2017 reflect both the needs of the global research community such as energy and health, as well as the needs that are specific to Africa.

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4. Materials for ENERGY
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6. NANOSCIENCE/NANOTECHNOLOGY
7. Materials EDUCATION/NETWORKING
8. COMPUTATIONAL MATERIAL SCIENCE

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