

5th National Global Change Conference



Research and Innovation Accelerating Transformations
to Global Sustainability

CONFERENCE
PROGRAMME

www.ufs.ac.za



The Department of Science and Innovation (DSI) and the National Research Foundation (NRF), in partnership with the University of the Free State (UFS), are happy to welcome you to the 5th National Global Change Conference.

The National Conferences on Global Change have been held biennially under the banner of the Global Change Grand Challenge (GCGC), one of the focus areas known as grand challenges in the Ten-Year Innovation Plan (TYIP) of the DSI since 2012. These conferences are aimed at providing a platform for networking and knowledge sharing among global change stakeholders to share and debate the latest research and innovations accelerating transformation. Active participation by early career researchers is strongly encouraged.

IMPORTANT CONTACT NUMBERS

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— W E L C O M I N G M E S S A G E —



On behalf of the GCC5 Organising Committee and the Global Change Science Committee, I

am honoured and delighted to welcome you to the Fifth National Global Change Conference, at the University of the Free State. The programme is rich and varied, with an exciting range of presentations – one keynote address, one scientific address, three additional plenary presentations, and twelve guest speakers. Add to that the 288 oral and poster presentations – and we have a jam-packed and full programme.

Since the first National Global Change Conference, held in 2012, this event has grown in leaps and

bounds – so today we can welcome over 500 delegates, many of whom are students and early career researchers. This bodes well for our country, as we tackle the challenges associated with global change. The partnership between the Department of Science and Innovation, the National Research Foundation and the University of the Free State are to be congratulated in collaboratively putting together GCC5, which has surpassed all previous records.

I know that the success of the conference depends ultimately on the many people who have worked with us in planning and organising both the scientific programme and supporting social arrangements. Recognition should go to the UFS Local Organising Committee members who have all worked extremely hard for the details of important aspects of the conference programmes and social activities. Only those who have experienced the organisation of such an important event will understand how much human effort goes into the preparation for these four days of intense activity.

Welcome to GCC5! I hope you will take the opportunity to enjoy all it has to offer – build new friendships and networks and strengthen existing ones.

DR WISEMEN CHINGOMBE

GCC5 COMMITTEES

SOUTH AFRICAN GLOBAL CHANGE SCIENCE COMMITTEE (2023)

- Prof Kingsley Ayisi, University of Limpopo
- Prof Paulina Bopape-Mabapa, University of Limpopo
- Prof Laura Bosch-Pereira, University of the Witwatersrand
- Dr Wisemen Chingombe, University of Mpumalanga (Interim Chair)
- Dr Christina Culwick-Fatti, University of the Witwatersrand, Gauteng City-Region Observatory
- Ms Ditebogo Lebea, South African Institute of International Affairs
- Dr Phetole Mangena, University of Limpopo
- Ms Dorah Marema, South African Local Government Association
- Dr Tebogo Mashifana, University of Johannesburg
- Dr Dylan McGarry, Rhodes University
- Dr Elvis Nkoana, Unisa
- Prof Dawid Serfontein, North-West University
- Mr Mpho Sekgala, Department of Agriculture, Land Reform and Rural Development
- Prof Catherine Sutherland, University of KwaZulu-Natal

GCC5 ORGANISING COMMITTEE (CORE TEAM)

- Dr Wisemen Chingombe, Global Change Science Committee
- Mr Herkulaas Combrink, University of the Free State
- Prof Katinka de Wet, University of the Free State
- Mr Jonathan Diederiks, National Research Foundation
- Ms Kogilam Govender, Department of Science and Innovation
- Ms Ntombizini Manana, National Research Foundation
- Mr Leluma Matoane, Department of Science and Innovation
- Dr Henry Roman, Department of Science and Innovation
- Prof Corli Witthuhn, University of the Free State



UFS LOCAL ORGANISING TEAM

- Prof Samuel Adelabu, Department of Geography
- Mr Dan Alexander, Security Services
- Mr Craig Armstrong, Facilities Management
- Mr Thato Block, Facilities Management
- Dr Martin Clark, Department of Geology
- Mr Herkulaas Combrink (Co-chair), Faculty of Economic and Management Sciences, and Interdisciplinary Centre for Digital Futures
- Prof Katinka de Wet (Co-chair), Department of Sociology, and Interdisciplinary Centre for Digital Futures
- Ms Ria Deysel, Facilities Management
- Prof Linus Franke, Department of Soil, Crop and Climate Sciences
- Mr Gerard Hoogendoorn, Facilities Management
- Mr Jemaine Kally, Facilities Management
- Ms Lacea Loader, Department of Communication and Brand Management
- Dr Jacques Maritz, Department of Engineering Sciences
- Prof Sethulego Matebesi, Department of Sociology
- Ms Alfi Moolman Directorate of Community Engagement
- Ms Kgomotso Motlhakoana, Interdisciplinary Centre for Digital Futures
- Mr Barend Nagel, Department of Communication and Brand Management
- Ms Marlete Paulsen, Department of Finances
- Ms Alicia Pienaar, Department of Communication and Brand Management
- Mr Wilson Pongwane, Security Services
- Dr Nitha Ramnath, Department of Communication and Brand Management
- Mr Ronald Sinra, Faculty of Economic and Management Sciences
- Prof Johan van Niekerk, Department of Sustainable Food Systems and Development
- Dr Karen Venter, Directorate of Community Engagement
- Ms Valamy Vermeulen, Facilities Management

As a team we are deeply grateful for the wonderful support provided by our extensive panel of reviewers. The quality of the programme is in no small measure due to their contribution, under difficult circumstances.

GCC5 PROGRAMME

@ A GLANCE

DAY 1 MONDAY, 30 JANUARY 2023		
08:00	Registration	
09:00	Opening Plenary Session	Wynand Mouton Theatre
TIME	TRACK	VENUE
14:00-17:30	Climate Change & Biodiversity	EWB Auditorium (Lower Ground Floor)
14:00-17:30	Alternative Energy	LG8 (Lower Ground Floor)
14:00-17:30	Ocean Monitoring	G2 (Ground Floor)
14:00-17:30	Climate-smart Agriculture	G4 (Ground Floor)
14:00-17:30	Resilient Cities & Communities	101 (First Floor)
14:00-17:30	Innovative Opportunities in Science	103 (First Floor)
14:00-17:30	Understand Venture Capital in South Africa	G3 (Ground Floor)
18:30	Meet & Greet @ UFS	
DAY 2 TUESDAY, 31 JANUARY 2023		
09:00	Plenary Session	EBW Auditorium (Lower Ground Floor)
TIME	TRACK	VENUE
11:20-13:00	Climate Change & Biodiversity	EWB Auditorium
11:20-13:00	Smart Grids	LG8 (Lower Ground Floor)
11:20-13:00	Knowledge for Global Change	G2 (Ground Floor)
11:20-13:00	Climate-Smart Agriculture	G4 (Ground Floor)
11:20-13:00	Extreme Climate Events	101 (First Floor)
11:20-13:00	Leadership for Sustainability Transformation	103 (First Floor)
14:00-17:50	Climate Change & Biodiversity	EWB Auditorium
14:00-16:50	Smart Grids	LG8 (Lower Ground Floor)

14:00-17:00	Knowledge for Global Change	G2 (Ground Floor)
14:00-17:45	Climate-smart Agriculture	G4 (Ground Floor)
14:00-17:45	Extreme Climate Events	101 (First Floor)
14:00-16:00	Leadership for Sustainability Transformation	103 (First Floor)
16:30-17:45	Sustainable Cities - Phuthaditjhaba	103 (First Floor)
16:50-17:45	Minerals Carbonation	LG8 (Lower Ground Floor)
17:45	Group 1: Visit to Naval Hill Planetarium / Group 2: Visit to Boyden Observatory	
DAY 3 WEDNESDAY, 1 FEBRUARY 2023		
09:00	Plenary Session	EWB Auditorium (Lower Ground Floor)
TIME	TRACK	VENUE
11:20-13:00	Climate Change & Biodiversity	EWB Auditorium (Lower Ground Floor)
11:20-13:00	Off-grid Cities: Considerations for sustainability & Justice	LG8 (Lower Ground Floor)
11:20-13:00	Climate & Health	G2 (Ground Floor)
11:20-13:00	Agriculture in a Changing Climate	G4 (Ground Floor)
11:20-13:00	Soil, Land & Climate Change	101 (First Floor)
11:20-13:00	Water Resources & the Global Climate Crisis	103 (First Floor)
11:30-13:00	Education & Skills Transformation for Just Transitions, Sustainability & the Future of Work	G3 (Ground Floor)
14:00-17:30	Climate Change & Biodiversity	EWB Auditorium
14:00-17:30	Carbon Dioxide Removal	LG8 (Lower Ground)
14:00-17:30	Climate & Health	G2 (Ground Floor)
14:00-17:30	Agriculture in a Changing Climate	G4 (Ground Floor)
14:00-17:30	Soil, Land & Climate Change	101 (First Floor)

GCC5 PROGRAMME

@ A GLANCE

14:00-17:30	Water Resources & the Global Climate Crisis	103 (First Floor)
14:00-17:30	Education & Skills Transformation for Just Transitions, Sustainability & the Future of Work	G3 (Ground Floor)
18:30	Gala Dinner @ Leopards and Lace	
DAY 4 THURSDAY, 2 FEBRUARY 2023		
09:00	Plenary Session	EWB Auditorium (Lower Ground Floor)
TIME	TRACK	VENUE
11:20-13:00	Water Resources & the Global Climate Crisis	EWB Auditorium (Lower Ground Floor)
11:20-13:00	Managing Global Change	LG8 (Lower Ground)
11:20-13:00	Master's in Climate Change & Sustainable Development	G2 (Ground Floor)
11:20-13:00	Business Adaptation to Global Change	G4 (Ground Floor)
11:20-13:00	Waste Management	101 (First Floor)
11:20-13:00	Technology for Global Change	103 (First Floor)
11:20-13:00	Habitable Planet	TBC
14:00-16:00	Water Resources & the Global Water Crisis	EWB Auditorium (Lower Ground Floor)
14:00-16:00	Managing Global Change	LG8 (Lower Ground Floor)
14:00-16:00	Drones	G2 (Ground Floor)
14:00-16:00	Food Security	G4 (Ground Floor)
14:00-16:00	Waste Management	101 (First Floor)
14:20-16:00	Habitable Planet	103 (First Floor)
14:00-16:00	The South African Risk & Vulnerability Atlas	G3 (Ground Floor)
16:15	Closing Plenary Session & Prize Giving	EWB Auditorium (Lower Ground Floor)
17:45	Group 1: Visit to Naval Hill Planetarium / Group 2: Visit to Boyden Observatory	

POSTER SESSIONS

Session	Day	Time	Venue
Alternative Energy	Day 1	16:50 – 17:30	LG8 (Lower Ground)
Ocean Monitoring	Day 1	16:50 – 17:30	G2 (Ground Floor)
Climate Change & Biodiversity (Vegetation & Invasives)	Day 2	10:10 – 11:10	EBW Auditorium
Water Resources (Management)	Day 2	10:10 – 11:10	103 (First Floor)
Health & Climate Change	Day 2	16:30 – 17:30	G2 (Ground Floor)
Minerals Carbonation	Day 2	17:30 – 17:40	LG8 (Lower Ground)
Climate-Smart Agriculture (1)	Day 2	16:50 – 17:40	G4 (Ground Floor)
Waste Management	Day 3	10:10 – 11:30	G3 (Ground Floor)
Climate-Smart Agriculture (2 - Smallholder)	Day 3	10:10 – 11:00	101 (First Floor)
Soil, Land & Climate Change	Day 3	14:20 – 17:30	101 (First Floor)
Water Resources (Quality)	Day 3	15:00 – 17:30	103 (First Floor)
Agriculture in a Changing Climate	Day 3	15:40 – 17:30	G4 (Ground Floor)
Resilient Cities & Communities	Day 4	10:10 – 11:20	101 (First Floor)
Climate Change & Biodiversity (Coastal)	Day 4	10:10 – 11:10	103 (First Floor)
Climate-Smart Agriculture (3 – Crops)	Day 4	11:20 – 13:00	G3 (Ground Floor)
Business Adaptation to Global Change	Day 4	12:40 – 13:00	G4 (Ground Floor)
Technologies for Global Change	Day 4	12:20 – 14:20	101 (First Floor)
Water Resources (Access)	Day 4	14:20 – 16:00	EBW Auditorium
Managing Global Change	Day 4	15:00 – 16:00	LG6 (Lower Ground)
Food Security	Day 4	15:00 – 16:00	G4 (Ground Floor)

MAIN SPEAKERS' BIO SKETCHES

DR BLADE NZIMANDE (KEYNOTE ADDRESS)

Dr Bonginkosi Emmanuel “Blade” Nzimande was appointed as Minister of Higher Education, Science and Innovation on 30 May 2019. He was Minister of Transport from 27 February 2018 to 25 May 2019 and the Minister of Higher Education and Training from



26 May 2014 until 17 October 2017. He is a General Secretary of the South African Communist Party; former chairperson of the Parliamentary Select Committee on Education; former deputy chair of the Central Committee of the South African Communist Party; and the former chairperson of the Financial Sector Campaign Coalition. Dr Nzimande holds a Doctorate in Philosophy

specialising in Sociology from the University of Natal. He lectured at the University of Zululand in 1985 and was a lecturer in Industrial Psychology at the University of Natal in 1987. He was a Council member at the University of South Africa; a member of the National Deployment Committee of the ANC; chairperson of the board of trustees at the Centre for Educational Policy Development; a council member at the University of Transkei; a council member at the University of KwaZulu-Natal, and chairperson of the African National Congress Parliamentary Study Group on Education. Dr Nzimande has published several publications, including writing a book titled *Children of wars: the impact of violence on schooling in Natal*.

PROF TSHILIDZI MARWALA (SCIENTIFIC ADDRESS)

Professor Tshilidzi Marwala is the incoming Under-Secretary-General of the United Nations (UN) and a Rector of the UN University from 1 March 2023. He is currently the Vice-Chancellor and Principal of the University of Johannesburg (UJ), with 50,000 students and 8,000 staff members. He is a trustee of the Nelson Mandela Foundation, Chair of the Africa Health Research Institute (AHRI) and serves on the Nedbank Board. He is a member of the American Academy of Arts and Sciences, The World Academy of Sciences (TWAS), the African Academy of Sciences and the Academy of Science of South Africa. He has supervised 37 doctoral students (from more than 20 countries in Africa, Asia, Europe, the Middle East and the Americas) to completion. Some of his prominent students include Professor Fulufhelo Nelwamondo, the Chief Executive Officer of the National Research Foundation (NRF) and Professor Rendani Mbuva of Wits University and the University of London. He was born in Duthuni Village and matriculated at Mbilwi Secondary School. He holds a Bachelor of Science in Mechanical Engineering (*magna cum laude*) from Case Western Reserve University in the USA, a master of mechanical engineering from the University of Pretoria, and a PhD in Artificial Intelligence from the University of Cambridge in England. He has published 25 books on artificial intelligence, one of which has been translated into Chinese, over 500 articles in journals, proceedings, book chapters and newspapers, and holds five international patents.

He was a Deputy Vice-Chancellor for Research and Dean of Engineering at UJ. Before UJ, he was the Carl and Emily Fuchs Chair of Systems Engineering



and the SARChI Chair of Artificial Intelligence at the University of the Witwatersrand. He was a post-doctoral research associate at the Imperial College (London). His research interests are multi-disciplinary, including the theory and application of artificial intelligence to engineering, computer science, finance, social science, and medicine. He has been a visiting scholar at Harvard University, the University of California at Berkeley, the University of Cambridge and Nanjing Tech University. His writings and opinions have been featured in media such as the New Scientist, The Economist, Time, CNN, BBC, Cambridge Union and Oxford Union.

As Vice-Chancellor, he positioned UJ to drive the fourth industrial revolution (4IR) in South Africa to accelerate the United Nations' Sustainable Development Goals (SDGs). UJ ranked first in Africa in 2021 and 2nd in 2022 Times Higher Education (THE) University Impact Rankings on Sustainable Development Goals. It ranks 2nd in Africa in the latest QS Global University Rankings. UJ increased its research output from position 6 to position 2 in South Africa and is poised to become the largest producer of research in Africa. He is a formidable fundraiser, and under his leadership, UJ increased the endowment from R1 billion to R4 billion in the last five years. Under his leadership, UJ acquired two additional campuses, Devland Innovation Campus and JBS Park, and completed the Soweto Residence Complex. Furthermore, UJ increased its electricity consumption from solar energy from 0% to 13%. Marwala has received an honorary doctorate from Caucasus University in Tbilisi, Georgia.

PLENARY INVITED SPEAKERS

PROF FRANCOIS ENGELBRECHT (PLENARY ADDRESS – 31 JANUARY)



Francois Engelbrecht is Distinguished Professor of Climatology and Director of the Global Change Institute of the University of the Witwatersrand in South Africa. He specializes in climate model development

and the simulation of climate variability and change in Africa and the Southern Hemisphere. Engelbrecht has established extensive regional climate modelling capabilities in South Africa, and leads the development of an African-based Earth System Model. He served as an invited Lead Author of the IPCC's Special Report on Global Warming of 1.5 °C (2018) as well as of the Assessment Report Six Working Group I report (2021). Currently serves as co-chair of the Scientific Steering Group of CLIVAR of the World Climate Research Programme (WCRP), co-chair of the Joint Expert Team on Earth System Implementation of the World Meteorological Organisation and as elected President of the South African Society of Atmospheric Sciences.

PROF LAURA PEREIRA (PLENARY ADDRESS – 1 FEBRUARY)



Laura Pereira is an Associate Professor at the Global Change Institute at Wits University. She is an interdisciplinary sustainability scientist, trained in ecology, law, zoology and human

geography. She completed her DPhil in Geography at Oxford University in 2012, and fellowships at Harvard's Kennedy School, University of Cape Town and City, University of London. She also held research positions at Stellenbosch University and Utrecht University. She is interested in the interface between traditional knowledge and innovation, the role of futures techniques in enabling transformative change and developing innovative methods for knowledge co-production in Global South contexts. Her work uses the food system to unpack broader challenges and solutions to the complexity of governance for sustainability transformations. She continues to work on issues of climate change and biodiversity loss, connecting diverse bodies of knowledge and decolonial approaches to understanding potential solutions to sustainability challenges. Laura sits on the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES) Task Force on scenarios and models and is member of the FACCE-JPI Scientific Advisory Board. She was a Co-ordinating Lead Author for UN Environment's GEO-6 report and is a contributing author to WGII Africa chapter of the IPCC 6th Assessment Report,

and is a member of the Earth Commission's Working Group 4 on Transformations. She holds a research position at the Stockholm Resilience Centre, Stockholm University and an extraordinary appointment at the Centre for Sustainability Transitions at Stellenbosch University.

**MR HAPPY
KHUMBULE**
(PLENARY ADDRESS – 2 FEBRUARY)



Happy Khumbule studied law at the University of Johannesburg and is recognized by the British Council as a Global Change-maker and International Climate Champion. In 2013, he was part of the Mail

& Guardian Top 200 Young South Africans. Happy is the former Greenpeace Africa senior political advisor on climate and energy. Currently, Happy is an official party delegate to the United Nations Framework Convention on Climate Change and negotiates various issues such as Paris Agreement implementation and Response Measures. Happy serves on the Paris Agreement Compliance Committee. He is a non-executive director in Mansa Advisory. He serves on various boards, including the CleanCity SA board, as an independent non-executive board chairperson. Happy was a commissioner in the inaugural President's Coordinating Commission on Climate Change (PCC) and is Business Unity South Africa's head of Environment and Energy.

INVITED GUEST SPEAKERS

DR MARY-JANE BOPAPE (31 JANUARY)



Mary-Jane Bopape is the Managing Director of the National Research Foundation (NRF) - South African Environmental Observation Network (SAEON). Prior to joining the NRF, she was the Research

Senior Manager and Chief Scientist: Weather Research at the South African Weather Service and Senior Researcher at the Council for Scientific and Industrial Research. Dr Bopape holds a PhD in Meteorology from the University of Pretoria, and is currently leading activities on a weather and climate project to implement the Southern African Development Community (SADC) Cyber-Infrastructure Framework. She is one of twenty one 2019 Climate Research for Development (CR4D) fellowship grantees and a 2021 AIMS Women Fellow in Climate Change Science. She is a co-recipient of the 2008 World Meteorological Organization (WMO) award for young researchers, and a recipient of the 2013 Council for Scientific and Industrial Research (CSIR) Natural Resources and the Environment (NRE) most promising young researcher award. She served as the co-President of the South African Society for Atmospheric Sciences (SASAS) during the 2018-2020 term and was listed as one of the most influential Africans of 2021 by the New African magazine.

DR LEONARDO RYDIN GORJÃO (31 JANUARY)



Leonardo Rydin Gorjão received a BSc in physics from the University of Lisbon, Portugal, in 2014, an MSc in physics from the University of Bonn, Germany, in 2017, and a PhD in physics from the University

of Cologne, Germany, and the University of Oslo, Norway, in 2021. He is currently an Associate Professor at the Institute of Physics, Norwegian University of Life Sciences, Norway. His main research focus lies between power systems and physics-centric data analysis. He focuses on how physics can help improve our understanding of renewable energies, power-grid stability, energy markets, and microgrids - to answer the question "How can network sciences, dynamical and stochastic processes, and generally complex systems aid us in living in a more sustainable world?". In his research, he aims for a balance of applied physics and data sciences. The topics that interest him are power-grid stability, electricity price dynamics, and the impact of renewable energy on the aforementioned. He is also involved in projects working with paleo-climate and psychopathology data analysis.

MS LETEBOHO MAKHELE
(30 JANUARY)



Liteboho Makhele is a seasoned Urban Sustainability Specialist and Programme Manager with 20 years' experience working across public and private sector organisations on sustainability management, climate change mitigation and adaptation, urban development and applied research. In her current role as Programme Manager: Sustainable and Resilient Cities at the South African Cities Network, her work focuses on the institutional and governance shifts that are required to accelerate sustainability transitions in cities. Recognising that the transition to sustainable urban development is not the sole responsibility of cities, Liteboho's functions involve knowledge application and fostering peer-to-peer learning between cities; strengthening strategic partnerships and encouraging multi-level, multi-sectoral collaboration among key urban actors. Over the years, Liteboho has had the opportunity to work on the planning, design and implementation of urban infrastructure and sustainability projects for a diverse set of organisations. She is a Salzburg Global Fellow for Parks for the Planet Forum and a Danida Fellow for Environmental Governance. Liteboho is also a mentor on the Emerging Urban Leaders Program which is co-convened by Salzburg Global Seminar and World Urban Parks.

PROF VUKOSI MARIVATE
(2 FEBRUARY)



Vukosi Marivate is the ABSA UP Chair of Data Science at the University of Pretoria and an Associate Professor of Computer Science. Vukosi works on developing Machine Learning/Artificial Intelligence methods

to extract insights from data. A large part of his work over the last few years has been in the intersection of Machine Learning and Natural Language Processing. Vukosi's work in this area focuses on techniques to improve tools for and availability of data for local languages or low resource languages. He currently serves as a chief investigator on the Masakhane NLP project (<https://www.masakhane.io/>) and on the steering committee of the Lacuna Fund (<https://lacunafund.org/>). As part of his vision for Data Science, Vukosi is interested in Data Science for Social Impact (<https://dsfsi.github.io/>), using local challenges as a springboard for research. In this area, Vukosi has worked on projects in science, energy, public safety and utilities. Vukosi is a co-founder of the Deep Learning Indaba, the largest Machine Learning/Artificial Intelligence workshop on the African continent, aiming to strengthen African Machine Learning.

INVITED GUEST SPEAKERS

PROF GUY MIDGLEY (30 JANUARY)



Guy Midgley, head of Stellenbosch University's School for Climate Studies, has worked in the fields of global change and biodiversity science since the 1980s, including a 32-year career at the

South African National Biodiversity Institute. He took up a Professorship at Stellenbosch University (Botany and Zoology) in 2014. He has held lead roles in international scientific assessments (IPCC 4th, 5th and 6th Assessments, CBD ad hoc Technical Expert Group, and IPBES Global Assessments) and national level syntheses for climate change policy guidance. With over 170 publications, he holds an NRF A-rating, has been a Thomson Reuters highly cited researcher (2014), and is rated amongst the top 200 most influential climate change scientists globally (2021). He is a holder of the SA Royal Society Marloth Medal and Humboldt Foundation Research Award for lifetime science contributions.

PROF PAUL OBERHOLSTER (2 FEBRUARY)



Paul Oberholster started his scientific research career at the CSIR in 2007, after his appointment as a Senior Scientist. In 2017, he became a Chief Scientist managing large multidisciplinary pro-

jects on the African continent related to integrated water resource management and natural base treatment solutions with the focus on ecological engineering. During this time, he acted as an Extraordinary Professor and Lecturer at the University of Stellenbosch, University of Pretoria, and the University of Western Cape. In 2019, he joined the University of the Free State as Director of the Centre of Environmental Management, while also managing the Ecological Engineering Institute for Africa (EEIA). In 2021, he was awarded the National Science and Technology Foundation (NSTF) award in the category Water Research Commission with the focus on natural base passive treatment technology. In 2022, he was elected as ASSAf member in recognition of his academic achievements in South Africa. Paul is currently rated among the top 2% in the world in the scientific category of engineering/technology and environmental engineering.

MR TLOU RAMARU
(2 FEBRUARY)



Tlou Ramaru is the Chief Director of Climate Change Adaptation in the Department of Forestry, Fisheries and the Environment, South Africa. His responsibilities entail oversight to the development

of the National Adaptation Strategy and associated frameworks. He coordinates efforts responding to climate change impacts through building adaptive capacity, natural resources and socio-economic resilience and emergency response capacity in South Africa. He also coordinates mainstreaming and integration of adaptation objectives across sectors and spheres of government (national, provincial and local). He previously coordinated South Africa engagement in Rio+20 and formulation of the Sustainable Development Goals.

DR JOY SHUMAKE-GUILLEMOT
(1 FEBRUARY)



Dr Joy Shumake-Guillemot leads the World Health Organization/World Meteorological Organization Climate and Health Joint Office in Geneva, Switzerland. She is an environmental health scientist and

public health practitioner who has worked with WHO, WMO, UNICEF and others to develop public health policy and programming for climate adaptation and risk management. She has extensive field experience in Africa, Asia and Latin America supporting public health and humanitarian assistance programmes. Her current work focuses on enabling WMO and WHO to work together to accelerate the availability, access and use of climate and weather information that can improve public health policy and practice. She plays a leading coordination role for the Health, Environment, and Climate Change Coalition (HECCC) between UN Environment, WHO and WMO. Joy has led several strategic efforts as the lead author of the WHO Operational Framework for Climate Resilient Health Systems, the health strategy for the Global Framework for Climate Services, the Climate Service for Health Guidebook and has contributed to numerous research, policy and technical publications. Joy received her Doctor of Public Health in Environmental Health Sciences from Johns Hopkins University.

INVITED GUEST SPEAKERS

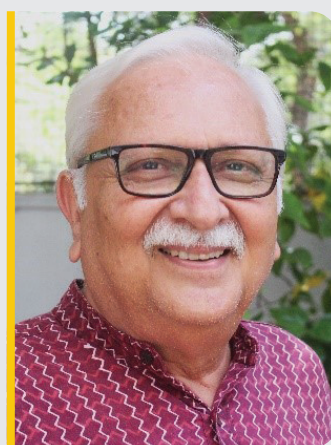
DR MARK TADROSS (30 JANUARY)



Mark Tadross is a senior researcher at the Climate Analysis Group (CSAG) at the University of Cape Town, and a Technical Adviser to the United Nations Development Programme (UNDP). After graduating

with a PhD from Cambridge University in 1998, Mark worked within the IT sector before joining CSAG. He specialises in climate services, early warning systems, agrometeorology and climate modelling/forecasting. He has worked with a range of NGOs, governments and international organisations – including the UN and World Bank – providing scientific/technical guidance and analytical support for understanding climate variability and change. His core areas of academic expertise include the physical basis for climate variability and change, as well as understanding the resulting impacts on agriculture, water resources and disaster management. He was a contributing author to the Intergovernmental Panel on Climate Change (IPCC) 4th assessment report and has over twenty years' experience working in least developed countries across a wide range of applications. Mark's current work with the UNDP involves supporting the design and implementation of GCF/GEF/bilaterally funded projects developing early warning systems and climate services.

PROF RAJESH TANDON (31 JANUARY)



Rajesh Tandon is an internationally acclaimed leader and practitioner of participatory research and development. He is the Founder-President of Participatory Research in Asia (PRIA), a global

centre for participatory research and training. He is also Co-Chair of the UNESCO Chair in Community Based Research and Social Responsibility in Higher Education since 2012. The UNESCO Chair grows out of and supports UNESCO's global lead to play a key role in assisting countries to build knowledge societies. Dr Tandon also heads the Forum for Indian Development Corporation (FIDC) as its Chairperson. He is Chairperson of the Committee to carry out appraisal of the UGC scheme under 'Unnat Bharat Abhiyan' and Member of Expert Group for Development of Educational Framework for Global Citizenship in Higher Education Institutions, constituted by the University Grants Commission. Rajesh holds a PhD in Management from Case Western Reserve University. A pioneer of participatory research, he has given new meaning to academic research by redefining the relationship between the researcher and the researched. He has been contributing to the emergence of several local, national and international initiatives to promote authentic and participatory development of societies.

PROF SUE WALKER
(1 FEBRUARY)



Sue Walker is Principal Researcher Agrometeorology at Agricultural Research Council – Natural Resources and Engineering, Pretoria. She is Professor Emeritus in Agromet at the University of the

Free State. She has supervised 21 PhD students and published more than 115 scientific articles and many technical reports. She obtained her PhD in Plant Physiology from the University of California Davis, USA, following her studies at the former University of Natal in Agricultural Meteorology. She develops climate services translating scientific results into useful operational messages, with experience in Southern, East Africa, and South East Asia on agrometeorological and development projects. She applies evidence-based science to agricultural concerns using crop-climate modelling, Agromet extension services for farmers, in semi-arid conditions using modern technology. Prof Walker was Project Leader for the ‘Rain for Africa’ project funded by the Netherlands Space Office and Climate-Smart Agriculture Training for Extension funded by GIZ. Sue is a member of the International Commission for Irrigation and Drainage – Working Group on Global Climate Change and Agricultural Water Management. She represented South Africa at WMO-CAGM from 1998-2014. She is a Fellow of South African Society of Crop Production, since January 2010 for good service provided to agriculture.

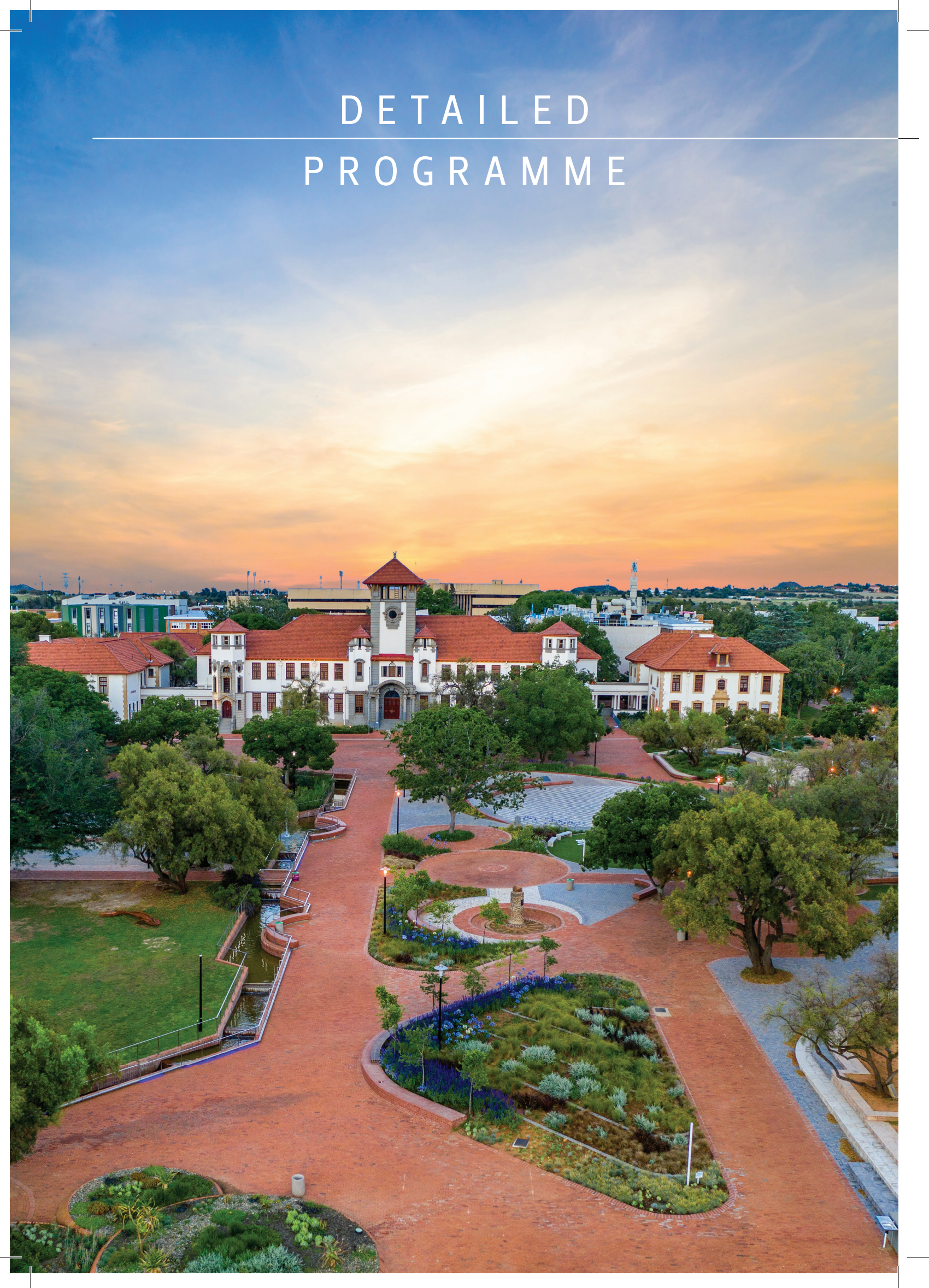
DR CARRADEE WRIGHT
(1 FEBRUARY)



Caradee Wright (PhD Public Health) is a Chief Specialist Scientist at the South African Medical Research Council leading the Climate and Health Research Programme. She is also an Adjunct Lecturer at the

University of Pretoria and Research Associate at the University of Johannesburg. Her research focuses on environmental health in Africa, with a focus on understanding climate change and air pollution on human health and well-being impacts to inform interventions and policy development. Her research fields also include solar ultraviolet radiation dosimetry and skin cancer prevention. Dr Wright has published more than 130 research articles in peer-reviewed accredited journals. Dr Wright was a Committee member of the World Health Organization Air Quality Guidelines Committee, an Intergovernmental Panel on Climate Change Assessment Report 6 Africa Chapter Author, a Chapter Lead Author of the United Nations Environment Programme (UNEP) / Stockholm Environment Institute African Assessment on Climate Change and Human Health and an author of several recently published UNEP reports. Dr Wright is currently a council member of the American Society for Photobiology, Technical Advisor to the World Health Organization (Air Quality), the International Livestock Research Institute (One Health), the Health Effects Institute (Global Health) and a Review Lead for the National Institute of Health / Nature Collection on Data Science for Health in Africa (Environmental Health / Climate Change).

DETAILED PROGRAMME



DAY 1 | 30 JANUARY 2023
OPENING PLENARY SESSION
DIRECTOR | DR PHIL MJWARA
VENUE | WYNAND MOUTON THEATRE

08:00	Registration	All delegates
09:00	Announcements and Housekeeping	Mr Herkulaas Combrink , Co-Chair, UFS Local Organising Committee
09:15	Introductions	Dr Phil Mjwara , Director-General, Department of Science and Innovation
09:25	Welcoming remarks, UFS	Prof Francis Petersen , Rector & Vice-Chancellor, University of the Free State Province
09:40	Welcoming remarks, Free State Province	Ms Sisi Ntombela , Premier of the Free State
09:55	Message from NRF	Prof Fulufhelo Nelwamondo , CEO of the National Research Foundation
10:00	Message from DFFE	Mr Shonisani Munzhedzi , CEO of the South African National Biodiversity Institute
10:30	Keynote Address	Dr Blade Nzimande , Minister of Higher Education, Science and Innovation
11:00	Performance by the Odeion String Quartet	
11:10	REFRESHMENTS	
11:45	Scientific Address	Prof Tshilidzi Marwala , Vice-Chancellor of the University of Johannesburg and incoming Rector of the United Nations University Technology for Leadership
12:30	Tree Planting	Dr Phil Mjwara , in honour of the late Prof Maarten de Wit and Prof Bob Scholes
	Photographs and Interviews	
13:00	LUNCH	

NOTES

DAY 1 | 30 JANUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)
	CLIMATE CHANGE & BIODIVERSITY Chair: Prof Peter Taylor	ALTERNATIVE ENERGY Chair: Dr Jacques Maritz	OCEAN MONITORING Chair: Dr Motebang Nakin
14:00	Guest Speaker: Prof Guy Midgley, Stellenbosch University	Guest Speaker: TBC	Thomalla SJ: Widespread changes in Southern ocean phytoplankton blooms linked to climate drivers
14:20			Mtshali, T: Seasonal depletion of. The dissolved iron reservoirs in the sub-Antarctic zone of the southern Atlantic Ocean
14:40	Payne, S: Camera surveillance of invertebrate abundance and plant phenology within a montane climate change experiment	Erasmus, L: Integrating a phosphor into a waveguide for solar energy application	Edworthy, C: A baseline assessment of costal pH variability in South Africa and insights for future ocean acidification research
15:00	Khuzwayo, LM: Tracking change over time in species diversity along the Thukela River and some of its tributaries	Jenkin, NP: Developing an energy skills roadmap to accelerate the just transition of South Africa's energy sector	Nicholson, S: South African Robotics and Ocean Technology Innovation Centre (SA-RobOTIC)
15:20	Fitchett, JM: Phenological shifts across southern Africa – a global change yardstick for t the public	Mathebula, N: Does off-grid energy access improve well-being in off-grid informal settlements? A field experiment with off-grid solar power	Monteiro, P: From basic science to regional and global societal impact by linking ocean CO2 observations with machine learning models
15:40	Sidla, S: Metabarcoding grass pollen in South Africa: A possible biomarker for climate change	Serfontein, D: The future of electricity generation in South Africa and what we can do about it: A techno-economic analysis	Thomalla, SJ: An optical approach to understanding the southern Ocean biological carbon pump
16:00	REFRESHMENTS		
16:30	Archibald, S: The African carbon budget	Adebule, A: Bioethanol production from two-forms of potato peels wastes: Optimized hybrid pre-treatment and fermentation condition on process kinetics	Pillay, K: An ecosystem approach to essential ocean monitoring: The integrated ecosystem programme
16:50	Maluleke, AM: A aired tower approach to compare carbon dioxide and water vapour fluxes between two vegetation types	POSTER SESSION Alternative Energy	POSTER SESSION Ocean monitoring
17:10	Nkhase, T: Estimating carbon dioxide fluxes from a wetland ecosystem using machine learning		

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DAY 1 | 30 JANUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	G4 (Ground Floor)	101 (First Floor)	103 (First Floor)	G3 (Ground Floor)
	CLIMATE-SMART AGRICULTURE Chair: Prof Paulina Bopape-Mobapa	RESILIENT CITIES & COMMUNITIES Chair: Prof Sethulego Matebesi	SAEON SESSION Innovative opportunities in science	SIDE EVENT Understand Venture Capital in South Africa
14:00	Guest Speaker: Dr Mark Tadross, UCT and UNDP	Guest Speaker: Ms Liteboho Makhele, SA Cities Network	Co-hosted by SAEON and Ocean Innovation Africa	Panel discussion with presenters <ul style="list-style-type: none"> • Nick Walter, OneBio Venture Capital • Wayne Stocks, University Technology Fund
14:20			<p>Welcome & Opening:</p> <ul style="list-style-type: none"> • Ms Nicole du Plessis, NRF-SAEON <p>Opening Address:</p> <ul style="list-style-type: none"> • Prof Keolebogile Motaung, DUT 	
14:40	Bam, S: Intelligent crop grouping and optimal crop planting decision using machine learning	Makhanya, TB: Mazibuyele emasizweni: Maintaining sustainable livelihoods through Ubuntu philosophy	<p>Introduction to SAEON:</p> <ul style="list-style-type: none"> • Dr Paul Gordijn, NRF-SAEON <p>NRF-SAEON hosted research infrastructure:</p> <ul style="list-style-type: none"> • Prof Juliet Hermes, NRF-SAEON 	
15:00	Zwane, PSM: Integration of ground-based vegetation parameters, thermal infrared and UAV multispectral data for mapping of crop canopy temperature	Niyobuhungiro, R: From illegal dumping to sustainable community garden, a community's initiative in Fisantekraal, Cape Town	<p>Science outreach at NRF-SAEON:</p> <ul style="list-style-type: none"> • Mr Thomas Mtontsi, NRF SAEON 	
15:20	Diniso, YS: Dairy farmers' knowledge and perception of climate change in the Eastern Cape Province, South Africa	Modise, TR: The effects of climate change on rural-urban migration in Moletjie community, Limpopo Province, South Africa	<p>Postgraduate and postdoctoral support</p> <ul style="list-style-type: none"> • TBC 	
15:40	Nyambo, P: Improving productivity, resilience and sustainability of smallholder farmer crop production systems through conservation agriculture	Ramataboe, L: Framework for the implementation of a climate change project in Lesotho		
16:00	REFRESHMENTS			
16:30	Makungo, R: Multicriteria decision analysis for prioritising climate adaptation strategies for smallholder farmers in Luvuhu River catchment	Bosman, G: Litema rural art and architecture: Global acts of care	<p>Ocean Startups Panel Discussion</p> <ul style="list-style-type: none"> • Dr Sara Andreotti (SharkSafe Barrier) • Mr Chris Thorpe (Inseco) • Dr Sarah Carroll (MariHealth) • Mr Yanga Gceya (Captain Fanplastic) <p>Closing remark:</p> <ul style="list-style-type: none"> • Ms Nicole du Plessis, NRF-SAEON 	
16:50		Latlhang, CA: Only 8 years left! Rethinking the role of public Private partnerships (PPPS) in the attainment of SDG Goal 11 in Botswana		
17:10		Alimi, SA: GIS-Assisted flood-risk potential mapping of Ilorin Metropolis, North Central Nigeria		
18:30	Meet @ Greet Function @ UFS			

DAY 2 | 31 JANUARY 2023 (MORNING)

PLENARY SESSION

CHAIR | DR WISEMEN CHINGOMBE

VENUE | EBW AUDITORIUM, EBW COMPLEX (LOWER GROUND FLOOR)

09:00	Welcome & Announcements	Dr Wisemen Chingombe , Chair of the South African Global Change Science Committee and University of Mpumalanga		
09:10	Plenary Address	Prof Francois Engelbrecht , Professor of Climatology and Director of the Global Change Institute , University of the Witwatersrand Did climate change cause the Durban floods? The need for attribution science in the Global South		
10:10	POSTER SESSION: 10:10-11:10 (EBW Auditorium) Climate Change & Biodiversity (Vegetation and invasives)		POSTER SESSION: 10:10-11:10 (Room 103) Water Resources (Management)	
11:00	REFRESHMENTS			
	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)	
	CLIMATE CHANGE & BIODIVERSITY Chair: Prof Sally Archibald	SMART GRIDS Chair: Prof Dawid Serfontein	KNOWLEDGE FOR GLOBAL CHANGE Chair: Prof Katinka de Wet	
11:20	Clark, VR : The Limpopo-Eswatini Escarpment – Extra-ordinary endemic plant richness and extinction risk	Guest Speaker: Dr Leonardo Gorjao OsloMet The role of physics in power grids	Guest speaker: Dr Rajesh Tandon Co-Chair of the UNESCO Chair in Community Based Research and Social Responsibility in Higher Education	
11:40	Hlongwane, JS : Spatiotemporal variability of vegetation coverage and land surface temperature in the city of Bloemfontein, South Africa			
12:00	Jombo, S : Exploring active LIDAR and very high spatial resolution optical data in tree mapping	Maritz, J : Stochastic model for SA grid	Sanjigadu, S : Addressing sustainable development goals by leveraging indigenous knowledge: Exploring opportunities and obstacles that Science and Mathematics teachers experience	
12:20	Mokoka, V : Adapt of die: Which species and plant functional types have the capacity to keep up with the changing climate in South African savannas?	Meintjes, P : Role of astrophysics in power grid protection	Coetzee, NN : An explorative study of teaching environmental studies in the South African Life Sciences curriculum	
12:40	Gordijn, P : Socio-ecological legacy effects on grassland transformation in the biodiversity rich Drakensberg Mountains	Maritz, E : Using graph theory to find faults in power grids	De Sousa, L : Global climate change education collaboration through actin research to transform learners and communities for sustainability	
13:00	LUNCH			

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DAY 2 | 31 JANUARY 2023 (MORNING)

VENUE | EBW COMPLEX

	G4 (Ground Floor)	101 (First Floor)	103 (First Floor)
	CLIMATE-SMART AGRICULTURE & FORESTRY Chair: Prof Kingsley Ayisi	ACCESS SESSION Extreme Climate Events Chair: Dr Neville Sweijd, ACCESS	FUTURE AFRICA SESSION A Public Conversation – Leadership for Sustainability Transformation Chair: Prof Heila Lotz-Sisitka
11:20	Leaver, J: Informal forest product harvesting in the Eastern Cape, South Africa: A recent assessment and proposed solutions to unsustainable use	SAWS presentation on Extreme Events	<p>In the context of a growing presence of international organizations aiming to set up African chapters, we ask how this interest and financial support can be coordinated to ensure the greatest benefit to the African continent and its people? This panel discussion will focus on the current efforts of Future Earth to set up an African Leadership Centre.</p> <p>Panellists: Dr Faten Bahar – Future Earth Mr Jason Owen – Future Africa</p>
11:40	Dovey, SB: Progress towards climate change adaptation and mitigating in plantation forestry		
12:00	Khoza, B: Physiological, biochemical and morphological responses of dibutyl dithiophosphate treated edamame under drought stress	Adegoke, J: Extreme precipitation dynamics and impacts of changing climate in coastal West Africa	
12:20	Sekhurwane, M: Influence of different selenium application methods on the physiology and morphology of drought-stressed edamame	Pinto, IP: Climate change exacerbated rainfall causing devastating flooding in eastern South Africa	
12:40	Moloi, MJ: A natural bio-stimulant consisting of a mixture of fish protein hydrolysates and kelp extract enhances the physiological, biochemical and growth responses of spinach	Abubakar, H: Spatiotemporal trend of extreme precipitation events for the period between 1961 and 2021 over the Enkangala escarpment of South Africa	
13:00	LUNCH		

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DAY 2 | 31 JANUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)
	CLIMATE CHANGE & BIODIVERSITY Chair: Prof Aliza le Roux	SMART GRIDS Chair: Dr Elizabeth Maritz	KNOWLEDGE FOR GLOBAL CHANGE Chair: Ms Kogilam Govender
14:00	Gwate, O: Exploring mechanism underlying the success of range expanding plants in Maloti-Drakensberg Mountains	Guest Speaker: Dr Leonardo Gorjao OsloMet Data analysis tools for noise models	Sanjigadu, S: Exploring causal mechanisms that impact climate change education (CCE): A case study of Natural Sciences and Geography teachers in the Keep-It-Cool CCE Programme
14:20	Makaota, K: Preliminary studies on population structure and ecological impacts of <i>Cylindropuntia pallida</i> (Cacaceae) in South Africa		Krishna, SBN: Promotion of global health economy: Supporting the generating of developmental opportunities through collaborative research and education
14:40	Mapaura, A: Climate change and predicted changes in distribution of invasive <i>Nassella</i> species in South Africa	Nel, W & Bezuidenhout, R: Smart resource trading	Mnisi, K: The metaverse (Virtual Reality): A learning-centred approach toward better learning and teaching
15:00	Maphanga, T: Using Sentinel-1 and Sentinel-2 coupled with cloud computing approaches in mapping non-native species in Kruger National Park and surrounding communities	Maritz, J & Esterhuysen, N: UFS Smart Grid	Jimu, T: Science to practice – Networked governance of sustainability transitions in African universities
15:20	Moabi, TG: The biological control agents <i>Carvalhotingis visenda</i> and <i>Hedwigella jureceki</i> as vectors for the adventive pathogen <i>Cercospora unguis-cati</i> in South Africa	Erasmus, SJ: UFS Carbon Report	Abrahams, E: Rethinking study abroad: Lessons and prospects from selected universities in the Western-Cape, South Africa
15:40	Xolo, S: A systematic review of alien and invasive terrestrial invertebrate species in South Africa	De Wet, J: Stellenbosch University Carbon Report	Tsakeni, M: Scoping perspectives on holistic approaches to teach science for sustainability
16:00	REFRESHMENTS		
16:30	Gwate, O: Assessing habitat suitability for selected range-expanding plant species in African mountains under climate change	Braune, M: A short journey through the University of Cape Town's Carbon footprint history & the response	POSTER SESSION: Health & Climate Change
16:50	Niba, AS: Response of epigeic invertebrates to invasive alien and indigenous plant cover, Eastern Cape Province: Implications for conservation management	MINERALS CARBONATION Chair: Prof Chris Curtis	
17:10	Raphela, T: The impact of <i>Lantana camara</i> on invertebrates and plant species of the Groenkloof Nature Reserve, South Africa	Nhlabathi, T: Investigating passive mineral carbonation in kimberlite tailings from Cullinan Diamond Mine, South Africa	
17:30		POSTER SESSION Minerals Carbonation	
17:45	<p>Group 1: Visit to the Naval Hill Planetarium: The UFS Centre for Earth and Space invites you to an immersive digital experience from the smallest atomic particles to the largest cosmological scales. Come and see the universe like never before at the first digital planetarium in Africa south of the Sahara</p> <p>Group 2: Visit to Boyden Observatory – an astronomical research observatory and science education centre located at Maselspoort, 20 km north-east of Bloemfontein</p>		

DAY 2 | 31 JANUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	G4 (Ground Floor)	101 (First Floor)	103 (First Floor)
	CLIMATE-SMART AGRICULTURE Chair: Prof Johan van Niekerk	ACCESS SESSION Extreme climate events Chair: Dr Neville Sweijd	ASSAf SESSION Transformative futures for water security Chair: Dr Melusi Thwala
14:00	Phehla, M: Biomass accumulation and leaf gaseous exchange of sorghum cultivars under varying nitrogen fertilizer rates	Guest Speaker: Dr Mary-Jane Bopape, SAEON	Jointly hosted by the Academy of Science of South Africa (ASSAf) and the International Water Management Institute (IWMI) Roundtable discussion to: <ul style="list-style-type: none"> • Obtain sector grounded suggestions to climate change adaptation for the South African water sector; and • Identify data and information gaps under the cloud of climate change to influence South Africa's planning for a water secure future Convenors: Dr Inga Jacobs-Mata and Dr Melusi Thwala
14:20	Sibuyi, R: Application of nano micronutrients. Plant extract and defence inducer as management strategy against Alternaria leaf spot of tomato		
14:20	Molobela, MT: Alternative usage of Melia azedarach for water use efficiency in Amaranthus Spp production and management of fusarium rot	Maboyi, RG: Historical rainfall data reveal increasing variability and extremes, but not changes in annual means, for north-eastern South Africa	
15:00	Masipa, NK: Assessing the impact of chicken manure application and water regime manipulation on selected soil properties and fusarium wilt	Johnson, K: Estimation of extreme rainfall events and development of methods to account for non-stationary climate data in design rainfalls in South Africa	
15:20	Mnisi, P: The control of Phytophthora infestans of potatoes using Lantana camara L. bio-based extracts in South Africa	Thoiti, WT: The contribution of mesoscale weather systems to extreme rainfall over coastal KwaZulu-Natal, April 2022	
15:40	Hepplethwaite, VJH: Mapping South Africa's sugarcane industry: Can a just transition be achieved?	Loader, N: Spatiotemporal analysis of heavy rainfall events across the Free State Province, South Africa: 1981-2022	
16:00	REFRESHMENTS		
16:30	Daniel, S: An analysis of dry-spells in the Western maize growing areas of South Africa	Ndayi, V: The impact of extreme wind on operations at Port of Cape Town	UFS-QQ RVSC SESSION Sustainable Cities – Phuthaditjhaba Chair: Dr Melissa Hansen
16:50	POSTER SESSION: Climate-smart Agriculture	Group exercise	<ul style="list-style-type: none"> • Clark, VR: Phuthaditjhaba – informing the future for a sustainable African mountain city: Perspectives from the UFS-QQ RVSC programme • Hansen, M: Trans-local learning – an approach for forming collective learning for sustainability • Clark, VR: Communities as beneficiaries of mountain tourism: A case study of Witsieshoek Mountain Lodge • Dube, J (Poster Presentation) • Sekhele, N (Poster Presentation)
17:10		Panel discussion	
17:30		Open discussion and route ahead	
17:45	<p>Group 1: Visit to the Naval Hill Planetarium: The UFS Centre for Earth and Space invites you to an immersive digital experience from the smallest atomic particles to the largest cosmological scales. Come and see the universe like never before at the first digital planetarium in Africa south of the Sahara</p> <p>Group 2: Visit to Boyden Observatory – an astronomical research observatory and science education centre located at Maselspoort, 20 km north-east of Bloemfontein</p>		

DAY 3 | 1 FEBRUARY 2023 (MORNING)

PLENARY SESSION

CHAIR | MR BARNEY KGOPE

VENUE | EBW AUDITORIUM, EBW COMPLEX (LOWER GROUND FLOOR)

09:00	Welcome & Announcements	Mr Barney Kgope , Director: Carbon Sinks Mitigation, Department of Fisheries, Forestry and the Environment
09:10	Plenary Address	Prof Laura Pereira , Xxaro Research Chair, Global Change Institute, University of the Witwatersrand Imagining transformative futures in the Anthropocene
10:10	10:10-11:30 : POSTER SESSION (G3) Waste Management	10:10-11:00 : POSTER SESSION (101) Climate-smart agriculture (2)
11:00	REFRESHMENTS	

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)	G4 (Ground Floor)
	CLIMATE CHANGE & BIODIVERSITY Chair: Dr Phetole Mangena	GCRO SESSION Off-grid Cities: Considerations for Sustainability & Justice Chair: Ms Christina Culwick-Fatti	ACCESS SESSION Climate & Health Chair: Dr Neville Sweijd	ARC SESSION Agriculture in a changing Climate Co-Chairs: Dr Ramontsheng Rapolaki & Dr Sarah Roffe
11:20	Von Maltitz, G: If ecosystem based adaptation is the solution, what is the problem	<ul style="list-style-type: none"> • Brown-Luthango, M: Informality and griddedness – infrastructure deficits and impacts on social processes – the case of Mossel Bay • Tarh, E: Social justice and the governance of solar energy • Middelmann, T: Hybrid infrastructure and the scales of energy transitions and climate change • Panel discussion 	Guest speaker: Dr Carradee Wright, SA Medical Research Council	Guest Speaker: Prof Sue Walker, ARC
11:40	Taylor, P: Small mammals as sentinels of climate change in African mountains			
12:00	Mdluli, V: Quantifying the effects of climate change and anthropogenic disturbance of bat communities in a montane grassland ecosystem		Lokotola, CL: Climate change and primary health care in Africa: a scoping review	Masupha, T: Role of policy on the effectiveness of agricultural drought early warning systems in South Africa
12:20	Howard, A: Acoustic activity of insectivorous bats on apple farms in the eastern Free State of South Africa		Le Roux, A: One health and zoonotic disease in a changing South Africa.	Mutema, M: Condition assessment model and irrigation water management tools for climate change adaptation
12:40	Ntloko, P: Developing a trait-based approach for assessing and predicting the potential vulnerability and resilience of South African macroinvertebrates to fine-sediment impact on the Tsitsa River and its tributaries	Martineau, P: Understanding and predicting the impact of climate variability in South Africa: from weather extremes to malaria outbreaks	Jordaan, FJ: Can genetic change reduce the carbon footprint of beef production in southern Africa?	
13:00	LUNCH			

DAY 3 | 1 FEBRUARY 2023 (MORNING)

VENUE | EBW COMPLEX

	101 (First Floor)	103 (First Floor)	G3 (Ground Floor)
	SOIL, LAND & CLIMATE CHANGE Chair: Mr Mpho Sekgwale	WATER RESOURCES & THE GLOBAL CLIMATE CRISIS Chair: Prof Samuel Adelabu	POSTER SESSION: Waste Management
11:20	Kotze, JJ: Digitally mapping soil carbon of the Tugela headwater catchment in the Maloti-Drakensberg, a remote an Afromontane mountain	Itzkin, A: Landscapes and communities: Approaches for integrated social-ecological monitoring of the Tsitsa River Catchment	From 11:30 RHODES UNIVERSITY ENVIRONMENTAL LEARNING RESEARCH CENTRE SESSION Education & skills transformations for just transitions, sustainability & the future of Work
11:40	Mashao, FM: Estimating soil organic carbon content using laboratory-based spectroscopy at Syferkuil Experimental Farm in Limpopo Province, South Africa	James, L: Perspectives on the role of stakeholder engagement and community participation in river basin management in South Africa: A study of the Hennops River	
12:00	Mbatyoti, S: Investigation of soil erosion vulnerable zones based on clustered geoinformatics approaches: A case study of the Tyume River catchment, Eastern Cape, South Africa	Gumede, N: Evaluation of Community participation in water resource management projects: A case study of Ink community	Presenters are from three major national programmes and are joined by Kogi Iyer from the DSI: <ul style="list-style-type: none"> • DSI/NRF CoP - Social Learning and Sustainable Development • Fundisa for Change Programme • Global Change Social Science: Skills Ecosystems for Food Security
12:20	Chari, MM: Helping farmers adapt to climate change: A review of applications of satellite soil moisture in Africa	Schutte, S: A national assessment of potential climate change impacts on hydrological yield for water resource management in South Africa	
12:40	Afuye, GA: Spatial Assessment of Land Use and Land Cover Change: A Systematic Mapping for Future Research and Development Planning	Nsibande, TN: Groundwater recharge mechanism, groundwater-surface water connection and groundwater dynamics in the Maputaland coastal plain	
			Overview and introduction of the panels: Heila Lotz-Sisitka (Session Chair) PANEL 1: Education, Training, Skills and Social Learning for Energy, Clean Water and Biodiversity Commons Presha Ramsarup, Nicola Jenkin, Heila Lotz-Sisitka, Farina Lindeque, Adela Itzkin, Phillip Ivey (video) PANEL 2: Education, Training, Skills and Social Learning for Climate Action and Just Transitioning of the Food System Nicola Jenkin, Victoria Hepplethwaithe, Angela Chapel, Scovia Adrupio, Clinton Nesengasi, Phindi Sithole PANEL 3: Teacher Education, Curriculum and Transformative Learning Innovations Shanu Misser, Eureka Rosenberg (video), Arorise Sibanda, Rob O'Donoghue (video), Sebastian Sanjigadu, Wilma van Staden PANEL 4: Education System Interventions, Evaluation and Impacts Presha Ramsarup, Shanu Misser, Kogilam Iyer (DSI), Eureka Rosenberg (video), Heila Lotz-Sisitka
13:00	LUNCH		

DAY 3 | 1 FEBRUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG8 (Lower Ground Floor)	G2 (Ground Floor)	G4 (Ground Floor)
	CLIMATE CHANGE & BIODIVERSITY Chair: Prof Sandy Steenhuisen	STELLENBOSCH UNIVERSITY SESSION Carbon Dioxide Removal	ACCESS SESSION Climate & Health Chair: Dr Neville Sweijd	ARC SESSION Agriculture in a changing Climate
14:00	Makwela, M: Carabid beetles as indicators of sustainable agro-ecosystem management	Discussion Panel: Barney Kgope (DFFE) - Facilitator Pedro Monteiro (Stellenbosch) Guy Midgley (Stellenbosch) Mary Jane Bopape (SAEON) Francois Engelbrecht (Wits)	Guest Speaker: Joy Shumake-Guillemot, WHO/ WMO Joint Climate & Health Office	Rapolaki, RS: Dry spells and wet days and their associated atmospheric circulation patterns over southern Africa in CIMP6 models
14:20	Muluvhahotho, M: Thermal tolerance responses of the two-spotted stink bug, <i>Bathycelia distincta</i>			Scholtz, M: Climate-smart beef production to cope with climate change
14:40	Munyai, C: Over a decade monitoring ant (Hymenoptera: Formicidae) biodiversity along an elevational gradient in the western Soutpansberg Mountains		Abdelatif, NA: Mapping malaria vectors to inform malaria control in Limpopo, Mpumalanga and KwaZulu-Natal, South Africa using climate driven models.	Myeni, L: Barriers and determinants to the adoption of climate-resilient seeds in smallholder settings of South Africa
15:00	Moyo, S: High altitude temporary systems and invertebrate composition in La Niña cycle, Maloti -Drakensberg		Pillay, M: The application of a deep learning transformer model: Modelling malaria incidence using a climate framework.	Madimabe, KS: Calibration and validation of Ceres-barley in DSSAT model for simulating growth and yield of barley (<i>Hordeum vulgare</i>) under future climate
15:20	Mbandzi, N: Assessment of heavy metals and possible biomagnification in macroalgae – limpet species along south east coast of South Africa		Roffe, S: Spatiotemporal characteristics of the universal thermal climate index (UTCI) characterising human thermal comfort across southern Africa: 1971-2021	Jiyana, ST: Mitigating carbon footprint from beef cattle through dietary inclusion of <i>Leucaena leucocephala</i>
15:40	Gerber, G: Ecosystem function during drought: A case study of subtropical South African estuaries		Makunyane, MS: Seasonal and weather type modification of the association between temperature variability and hospital admissions in Cape Town, South Africa.	POSTER SESSION: Agriculture in a changing climate
16:00	REFRESHMENTS			
16:30	Lugongolo, A: Environmental effects on morphometric and condition index of perna perna in bays and non-bays along the wild Coast of South Africa		Motlogeloa, OM: Exploring the role of climatic seasonality in the peak incidence of respiratory disease in South Africa	POSTER SESSION: Agriculture in a changing climate
16:50	Nkosi, ACV: The ecology of macrozoobenthic communities and taxa of Umdloti estuary during and after the El Niño induced drought		John, J: Reporting of climate vulnerabilities and adaptation actions in the health sector by the latest a-NDC.	
17:10			Panel Discussion	
17:30			Open Session & Way Forward	
18:30	GALA DINNER @ Leopards & Lace			

DAY 3 | 1 FEBRUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	101 (First Floor)	103 (First Floor)	G3 (Ground Floor)
	SOIL, LAND & CLIMATE CHANGE Chair: Prof Johan van Tol	WATER RESOURCES & THE GLOBAL CLIMATE CRISIS Chair: Dr Patricks Voua Otomo	RHODES UNIVERSITY ENVIRONMENTAL LEARNING RESEARCH CENTRE SESSION Education & skills transformations for just transitions, sustainability & the future of Work Chair: Prof Heila Lotz-Sisitka
14:00	Kidson, M: Soil Co2 flux measured on ploughed and conservation agriculture soil: Now and the future	Madonsela, BS: The impact of El Niño-Southern Oscillation (ENSO) on water quality in the Crocodile River in South Africa	
14:20	POSTER SESSION: Soil, land and climate change	Owolabi, ST: Investigation of extreme hydrological event risk impact on water quality; evidence from Buffalo Catchment Headwater, Eastern Cape, South Africa	
14:40		Ramulifho, P: Impact of sustainable and eco-friendly soil restoration technology on water resource quality status in upper Umkhomazi catchment	
15:00			
15:20		POSTER SESSION Water Resources (Quality)	
15:40			
16:00	REFRESHMENTS		
16:30			
16:50			
17:10			
17:30			
18:30	GALA DINNER @ Leopards and Lace		

NOTES

DAY 4 : 2 FEBRUARY 2023 (MORNING)

PLENARY SESSION

CHAIR | MR LELUMA MATOOANE

VENUE | EBW AUDITORIUM, EBW COMPLEX (LOWER GROUND FLOOR)

09:00	Welcome & Announcements	Mr Leluma Matookane , Director: Earth Systems Science, Department of Science and Innovation
09:10	Plenary Address	Mr Happy Khambule , Manager: Environment & Energy, BUSA, Delegate to the UNFCCC, and President's Coordinating Commission on Climate Change Just Transitions enablers of climate action or mitigators of impacts of climate action
10:10	POSTER SESSION 10:10-11:20 (101) Resilient Cities & Communities	POSTER SESSION: 10:10-11:10 (103) Climate change and biodiversity/Coastal
11:00	REFRESHMENTS	

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)	FGG170 EMS Building
	WATER RESOURCES & THE GLOBAL CLIMATE CRISIS Chair: Dr Wisemen Chingombe	MANAGING GLOBAL CHANGE Chair: Dr Elvis Nkoana	SARUA SESSION Masters' in Climate Change & Sustainable Development Chair: Prof Rene Pellissier	ACCESS SESSION Habitable Planet Dr Carl Palmer
11:20	Guest Speaker: Prof Paul Oberholster , Centre for Environmental Management, UFS	Guest Speaker: Mr Tlou Ramaru , Climate Change Adaptation, DFFE	Welcome & Introduction - Prof René Pellissier Avenant, M et al: Reviewing a Master's curriculum in Climate Change and Sustainable Development: data collection and analyses: Bester, M et al Curriculum for change: Developing a curriculum framework at Master's degree level in climate change and sustainable development Chicho, N et al: Programme Implementation: Master's Degree in Climate Change and Sustainable Development Silengo, M et al: The role of teaching & learning technologies: Master's Degree in Climate Change and Sustainable Development	
12:00	Mapuka, FN: Framing water supply sustainability and adaptation in drought-affected areas of Mbhashe and Mquma in the Amathole District Municipality	Mzileni, P: The New Geopolitics of Climate Wars in Africa		
12:20	Van Tol, J: South Africa needs a hydrological soil map: a case study from the upper uMngeni catchment	Seyisi, E: Developing indicators for monitoring and evaluating climate change adaptation responses in South Africa		
12:40	Kamba, E: Indigenous strategies of ensuring water security for cattle during droughts	Majahana, J: Approaches to Climate Change Adaptation Policy and Governance ;A Case of the Water Sector in Amathole District Municipality, South Africa		
13:00	LUNCH			

NOTES

DAY 4 : 2 FEBRUARY 2023 (MORNING)

VENUE | EBW COMPLEX

	G4 (Ground Floor)	101 (First Floor)	103 (First Floor)	G3 (Ground Floor)
	BUSINESS ADAPTATION TO GLOBAL CHANGE Chair: Ms Dorah Marema	WASTE MANAGEMENT CHAIR: Prof Rinie Schenck	TECHNOLOGIES FOR GLOBAL CHANGE Chair: Dr Henry Roman	POSTER SESSION Climate-Smart Agriculture (Crops)
11:20	Naidoo, V: Understanding a changing climate in the context of Mega-Projects- A South African Perspective	Schenck, C: Towards cleaner cities and towns: A three-pronged approach to waste composition determination	Guest Speaker: Prof Vukosi Marivate, University of Pretoria	
11:40	Muza, C: Environmental management accounting for sustainability in extractive industries	Mahlamvu, S: Development of an integrated solid waste management plan: The case study of student residences of PMB Campus, UKZN	Assegaai, EL: Transforming internal audit into blockchain technology within the Department of National Treasury in Bloemfontein	
12:00	Van Rooyen, D: Supporting youth through social entrepreneurship (SYSE): A South African perspective	Selomo, TG: Household solid waste management practises and perceptions in the Mankweng Cluster, Polokwane Local Municipality, South Africa	Muzanenhamo, A: Towards achieving organisational effectiveness: The effects of lack of digitalisation in South African public enterprises	
12:20	POSTER SESSION Business adaptation to Global Change	Otieno, BO: Food waste treatment in South Africa: A comparative study of ambient and prototype solar heated anaerobic digesters	POSTER SESSION Technologies for Global Change	
12:40		Sekwakwa, LM: Exploring the nexus between food waste and climate change: A legal appraisal		
13:00	LUNCH			

NOTES

DAY 4 : 2 FEBRUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	EBW Auditorium (Lower Ground Floor)	LG 8 (Lower Ground Floor)	G2 (Ground Floor)
	WATER RESOURCES & THE GLOBAL CLIMATE CRISIS Chair: Dr Marinda Avenant	MANAGING GLOBAL CHANGE Chair: Mr Herkulaas Combrink	UFS SESSION Drones Chair: Dr Martin Clark
14:00	Ndou, N: Impacts of climate change on water resources availability for agriculture in Nzhelele area, Limpopo Province	Hansen, M: Producing space: Human-Mountain relationships in the Maloti-Drakensberg Transfrontier Conservation Area	<p>A “fireside chat” involving three persons who represent various sides of drone applications in South Africa:</p> <p>– Mr Riaan Struwig, Mr Alexander Harding, and Dr Martin Clark (moderator), discussing the training, careers and use of drones in South Africa.</p> <p>This will be followed by four poster presentations by students involved in drone-related projects.</p> <ul style="list-style-type: none"> • Lemphane, NJ • Mkhwanazi, SM • Mokalusi, OL • Nduku, L • Tshabalala, P
14:20	POSTER SESSION Water Resources/Access	Onaolapo, T: The importance of urban green infrastructure in addressing the current global change: The role of the local authority	
14:40		Muchaku, S: Addressing the challenges confronting adaptation to climate change by capacitating traditional leaders and ward committees	
15:00		POSTER SESSION Managing Global Change	
15:20			
15:40			

CLOSING PLENARY SESSION DIRECTOR: JONATHAN DIEDERIKS 16:15 in the EBW Auditorium, EBW Complex (Lower Ground Floor)	
Conference Highlights and Outcomes	Dr Wisemen Chingombe , Chair, Global Change Science Committee
Awards	Ms Kogi Govender , Department of Science and Innovation
Closing Remarks	Prof Corli Witthuhn , Vice-Rector: Research & Internationalisation, UFS
17:45	<p>Group 1: Visit to the Naval Hill Planetarium: The UFS Centre for Earth and Space invites you to an immersive digital experience from the smallest atomic particles to the largest cosmological scales. Come and see the universe like never before at the first digital planetarium in Africa south of the Sahara</p> <p>Group 2: Visit to Boyden Observatory – an astronomical research observatory and science education centre located at Maselspoort, 20 km north-east of Bloemfontein</p>

DAY 4 : 2 FEBRUARY 2023 (AFTERNOON)

VENUE | EBW COMPLEX

	G4 (Ground Floor)	101 (First Floor)	103 (First Floor)	G3 Ground Floor
	FOOD SECURITY Chair: Ms Anathi Makamane	WASTE MANAGEMENT Chair: Dr Ben Otieno	ACCESS SESSION Habitable Planet Dr Carl Palmer	SAEON SESSION The South African Risk and Vulnerability Atlas: A showcase of the Atlas!
14:00	Jenkin, NP: Application of a skills ecosystem framework to articulate the skills required to enable South Africa's sustainable food systems pathways	Schenck, C: "Something major has gone wrong – the whole country is dirty": Towards engaged waste management		<p>Opening Remarks & Welcome:</p> <p>- Dr Henry Roman (DSI) and Dr Mary-Jane Bopape (NRF-SAEON)</p> <p>Presentations by SAEON SARVA team members:</p> <ul style="list-style-type: none"> • Caroline Mfopa • Galaletsang Keebine • Keneilwe Hlahane
14:20	Rusere, FR: Relationship between summer climate variability and household food security in rural. Mpumalanga Province, South Africa	Eregie, SB: Effect of ultra-violet light radiation on <i>Scenedesmus vacuolatus</i> growth process kinetics, metabolic performance and preliminary biodegradation study		
14:40	Goli, Z: Consumer perceptions on use of rabbit meat as an alternative animal protein source: University of Fort Hare students' based study	Kheswa, N: A quest for novel fungal species with the ability to bioremediate polyethylene in the eastern region of the Free State, South Africa: An eco-friendly solution to eliminate plastic pollution		
15:00	POSTER SESSION Food Security	Masvingwe, NP: Modelling and optimization of industrial lubricant waste biodegradation by <i>Achromobacter aegrifaciens</i>		
15:20		Mudzanani, K: Chemical Modified Biochar: A Sludge-Based Activated Carbon Adsorbent for the Removal of Organophosphorus Compounds from Wastewater		
15:40				

CLOSING PLENARY SESSION

DIRECTOR: JONATHAN DIEDERIKS

16:15 in the EBW Auditorium, EBW Complex (Lower Ground Floor)

Conference Highlights and Outcomes	Dr Wisemen Chingombe , Chair, Global Change Science Committee
Awards	Ms Kogi Govender , Department of Science and Innovation
Closing Remarks	Prof Corli Witthuhn , Vice-Rector: Research & Internationalisation, UFS
17:45	<p>Group 1: Visit to the Naval Hill Planetarium: The UFS Centre for Earth and Space invites you to an immersive digital experience from the smallest atomic particles to the largest cosmological scales. Come and see the universe like never before at the first digital planetarium in Africa south of the Sahara</p> <p>Group 2: Visit to Boyden Observatory – an astronomical research observatory and science education centre located at Maselspoort, 20 km north-east of Bloemfontein</p>

MORE INFORMATION ON THE FOLLOWING SESSIONS CAN BE FOUND ON THE GCC5 WEBSITE (gcc5.org.za.com):

- ACCESS Session on Extreme Climate Events
- ACCESS Session on Climate & Health
- ACCESS Session on Habitable Planet
- ARC Session on Agriculture in a Changing Climate
- ASSAf Session on Transformative futures for water security
- Future Africa Session on Leadership for Sustainability Transformation
- GCRO Session on Off-grid Cities: Considerations for sustainability & Justice
- Rhodes University Session on Education & Skills Transformations for just transitions, sustainability & the future of the work force
- SAEON Session on Innovative opportunities in Science
- SAEON Session on The South African Risk and Vulnerability Atlas
- SARUA Session on Master’s in Climate Change & Sustainable Development
- Stellenbosch University Session on Carbon Dioxide Removal
- UFS–QQ RVSC Session on Sustainable Cities - Phuthaditjhaba
- UFS Session on Drones

POSTER PROGRAMME

Poster presentations at GCC5 will not take the usual format of mounted posters on poster boards. They will instead be “lightning talks” of 4 minutes followed by 4 minutes for discussion.

AUTHOR	TITLE	THEME	DAY	TIME
Adegboye AA	BELIEF SYSTEM REGARDING CLIMATE AND EFFECT ON HEALTH-SEEKING BEHAVIOUR FOR NIGERIAN CHILDREN: A PROPOSED QUALITATIVE EXPLORATION	Health & Climate Change	Day 2	16:30-16:38
Adeleke SI	SYSTEMATIC REVIEW OF PLASTIC BAG POLLUTION ITS EFFECTS ON TERRESTRIAL AND MARINE ANIMALS AND WAY OUT.	Waste management	Day 3	11:20-11:28
Arendse E	NON-DESTRUCTIVE TECHNOLOGIES FOR QUALITY MEASUREMENT AND CONTROL OF POMEGRANATES	ARC: Agriculture in a Changing Climate	Day 3	17:20-17:28

Bhanye J	DECENTRALIZED ENERGY-WATER-FOOD SYSTEMS IN AFRICA: SPACE ANALYSIS, LEAST-COST MODELING OF SACK FARMING AND ESTABLISHMENT OF RENEWABLE ENERGY TECHNOLOGIES IN THE DIEPSLOOT SLUMS OF JOHANNESBURG, SOUTH AFRICA	Alternative Energy	Day 1	16:50-16:58
Bongoza S	ASSESSING HOUSEHOLD WATER-ENERGY NEXUS VULNERABILITIES: A CASE OF MATATIELE LOCAL MUNICIPALITY, EASTERN CAPE, SOUTH AFRICA	Water resources (Management)	Day 3	11:00-11:08
Campbell KM	COMPARATIVE POPULATION DYNAMICS OF FRESHWATER SHRIMPS (CARIDINA AFRICANA) OF LAKE SIBAYA: 40 YEARS ON.	Climate Change & Biodiversity (Coastal)	Day 4	10:20-10:28
Chidembo R	A REVIEW OF THE CLIMATE CHANGE IMPACT OF THE CULTIVATION AND CONSERVATION OF MEDICINAL PLANTS FOR VILLAGE CHICKEN HEALTH MANAGEMENT	Health & Climate Change	Day 2	17:00-17:08
Chilima CZ	SWITCHING TO SUSTAINABLE ENERGY OPTIONS IN MALAWI, IN THE PRESENCE OF RAMPANT DEFORESTATION, LANDSCAPE DEGRADATION AND CLIMATE CHALLENGES	Alternative Energy	Day 1	17:10-17:18
Dlaza T	RESPONSE OF SEAWEEDS TO ENVIRONMENTAL CONDITIONS ALONG THE SOUTH AFRICAN WILD COAST	Climate Change & Biodiversity (Coastal)	Day 4	10:50-10:58
Dube JD	CLIMATE CHANGE, INFORMAL ENTREPRENEURSHIP AND LIVELIHOOD STRATEGIES OF FEMALE ENTREPRENEURS IN THE AFROMONTANE: A SYSTEMATIC LITERATURE REVIEW.	Sustainable Cities - Phuthaditjhaba	Day 2	Between 14:00 and 17:45

Dube N	PHYTOCHEMISTRY, PLANT GROWTH AND INSECT PERFORMANCE IN VARIOUS INFESTATIONS OF PAREUCHATES INSULATA (LEPIDOPTERA: ACRTIINAE) ON INVASIVE ALIEN SHRUB CHROMOLAENA ODORATA (ASTERACEAE) IN SOUTH AFRICA	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	10:30-10:38
Dube T	BUILDING THE FOUNDATION FOR EFFICIENT MONITORING OF MESOPHOTIC FISHES TO SUPPORT MANAGEMENT OF THE UTHUKELA BANKS MARINE PROTECTED AREA	Climate Change & Biodiversity (Coastal)	Day 4	10:10-10:18
Dunyana P	EXPLORING INFLUENCE OF POWER DYNAMICS ON OUTCOMES OF COLLABORATIVE GOVERNANCE PROCESSES IN THE THUKELA CATCHMENT	Water resources (Management)	Day 3	10:20-10:28
Faulds BR	THE RELATIONSHIP BETWEEN WATER QUALITY AND GREENHOUSE GAS EMISSIONS AT THE AIR-WATER INTERFACE IN SMALL DAMS IN JOHANNESBURG, GAUTENG.	Water resources (Quality)	Day 4	14:20-14:28
Foxi G	DECOMPOSING THE RELATIVE CONTRIBUTIONS LAND USE/ COVER CHANGES ON WATER QUANTITY AND QUALITY FROM A GEOSPATIAL PERSPECTIVE: CASE OF MTHATHA CATCHMENT, EASTERN CAPE, SOUTH AFRICA	Water resources (Quality)	Day 4	15:20-15:28
Gebe Z	SPATIO-TEMP VARIABILITY OF PICOPHYTOPLANKTON GROUPS IN THE SOUTHERN BENGUELA OVER TWO SEASONAL CYCLES	Ocean Monitoring	Day 1	17:10-17:18
Gundula I	METHANE EMISSION FACTOR FOR DIFFERENT BEEF CATTLE GENOTYPES IN COMMERCIAL FEEDLOT PRODUCTION SYSTEMS, SOUTH AFRICA	ARC: Agriculture in a Changing Climate	Day 3	15:50-15:58

Hlangwani E	AN AI-HYBRID BIOPROCESSING APPROACH FOR THE PRODUCTION OF HIGH-QUALITY UMQOMBOTHI (SOUTH AFRICAN SORGHUM BEER)	Technologies for Global Change	Day 4	12:40-12:48
Hlongwane Z	INDIGENOUS KNOWLEDGE ABOUT THE CONSUMPTION OF EDIBLE INSECTS IN SOUTH AFRICA	Food security	Day 4	15:30-15:38
Hoossen Z	THE EFFECTS OF GEOSTATISTICAL DOWNSCALING ON EDDY KINETIC ENERGY IN THE SOUTHERN OCEAN.	Ocean Monitoring	Day 1	17:00-17:08
Howlett-Downing C	HEALTH RISK ASSESSMENT OF PM2.5 AND PM2.5-BOUND TRACE ELEMENTS IN PRETORIA, SOUTH AFRICA	Health & Climate Change	Day 2	16:40-16:48
Khoza OA	ASSESSMENT OF THE POST COVID-19 SOUTH AFRICAN ECONOMIC RECONSTRUCTION AND RECOVERY PLAN TOWARDS FOOD SECURITY	Food security	Day 4	15:00-15:08
Khune S	A COMPARATIVE STUDY OF MONODIGESTION OF WASTE-ACTIVATED SLUDGE AND CO-DIGESTION OF WASTE-ACTIVATED SLUDGE WITH FOOD WASTE USING A PROTOTYPE SOLAR-HEATED PILOT ANAEROBIC DIGESTER	Waste management	Day 3	10:10-10:18
Koalane AM	ASSESSING LONG-TERM CHANGES IN CLIMATE INDICES IN RELATION TO MAIZE PRODUCTION IN SELECTED SITES OF SOUTH AFRICA	ARC: Agriculture in a Changing Climate	Day 3	17:00-17:08
Lebepe R	DETERMINING THE WATER FOOTPRINT OF TOMATO AND BUTTERNUT PRODUCTION IN LIMPOPO PROVINCE, SOUTH AFRICA	Climate smart agriculture(3)/Crops	Day 4	11:40-11:48

Lekgothoane PL	GROWTH AND NUTRITIVE VALUE OF SELECTED SUMMER FORAGE LEGUMES AND THEIR CONTRIBUTIONS TO SUCCEEDING WINTER GRASS (SECALE CEREALE) IN DISTINCT AGRO-ECOLOGICAL ZONES OF LIMPOPO PROVINCE	Climate smart agriculture(3)/Crops	Day 4	12:20-12:28
Lemphane NJ	DELIVERY OF ANTIVENOM USING DRONES TO RURAL AREAS TO PROVIDE A QUICK RESPONSE IN LIVESTOCK FARMS	Drones	Day 4	Between 14:00 and 16:00
Lusizi Z	IMPACT OF WATTLE TREE SPECIES ON SOIL PHYSICO-CHEMICAL PROPERTIES AT MATATIELE IN EASTERN CAPE, SOUTH AFRICA	Soil, Land & Climate Change	Day 3	15:40-15:48
Mabasa NA	ASSESSMENT OF POLLUTION STATUS OF THE SWARTKOPS RIVER ESTUARY, EASTERN CAPE PROVINCE	Water resources (Quality)	Day 4	15:00-15:08
Mabitsela MM	UNDERUTILISED CROPS AND CLIMATE-SMART FARMING-CLIMATE CHANGE MITIGATING AND ADAPTATION	Climate smart agriculture(3)/Crops	Day 4	12:40-12:48
Maduray S	COMMUNITY STRUCTURE AND DIVERSITY OF MINIROPLANKTON IN THE SOUTHERN BENGUELA	Ocean Monitoring	Day 1	16:50-16:58
Mafumbu L	ASSESSING PUBLIC PERCEPTIONS ON COASTAL ACCESS – COMMUNITY PROFILE: A CASE STUDY OF NGQUSHWA LOCAL MUNICIPALITY, SOUTH AFRICA	Resilient Cities & Communities	Day 4	10:20-10:28
Magayiyana Z	INVESTIGATING GREEN TOURISM PRACTICES IN SOUTH AFRICA: A CASE STUDY OF THE WILD COAST TOURISM AMMENITIES	Business Adaptation to Global Change	Day 4	12:50-12:58
Mahlo D	EXAMINING WATER ACCESS CHALLENGES AND COPING STRATEGIES IN RURAL COMMUNITIES OF GREATER TZANEEN LOCAL MUNICIPALITY	Water resources (Access)	Day 3	15:20-15:28

Mahlobo T	IMPACT OF THE GALL-INDUCING FLY POLYMORPHOMYIA BASILICA SNOW (DIPTERA: TEPHRITIDAE) ON THE GROWTH AND REPRODUCTION OF CHROMOLAENA ODORATA (L.) R.M.KING & H.ROB (ASTERACEAE) IN THE LABORATORY	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	10:20-10:28
Majingo Z	SPECIES COMPOSITION AND RECRUITMENT OF TIDAL POOL FISHES IN SELECTED AREAS IN THE EASTERN CAPE, SOUTH AFRICA	Climate Change & Biodiversity (Coastal)	Day 4	11:00-11:08
Majova C	GROWING FOOD ON AIR! AEROPONICS AS AN INNOVATIVE TECHNOLOGY THAT IGNITES INTEREST IN RURAL HIGH SCHOOL LEARNERS TO FOLLOW CAREERS IN AGRICULTURAL SCIENCES	Food security	Day 4	15:20-15:28
Makuya V	DROUGHT IMPACTS ON MAIZE YIELD IN MAJOR MAIZE-PRODUCING AREAS IN THE FREE STATE PROVINCE BETWEEN 1990 AND 2020	ARC: Agriculture in a Changing Climate	Day 3	17:10-17:18
Mamapule S	DEVELOPMENT OF A CLIMATE CHANGE KNOWLEDGE PLATFORM IN SOUTH AFRICA USING NATURAL LANGUAGE PROCESSING	Technologies for Global Change	Day 4	14:00-14:08
Maniram A	THE IMPACTS OF DROUGHT ON THE RURAL COMMUNITIES OF MSINGA IN KWA-ZULU NATAL, SOUTH AFRICA	Resilient Cities & Communities	Day 4	10:40-10:48
Mantshontsho A	ESTABLISHING AN EFFECTIVE X-RAY POWDER DIFFRACTION TECHNIQUE FOR ACCURATE QUANTITATIVE CHARACTERISATION OF COMPLEX MULTI-PHASE ROCKS: IMPLICATIONS OF MINERAL CARBONATION IN KIMBERLITE TAILINGS AND BEYOND	Minerals Carbonation	Day 2	17:30-17:38

Maseko M	GROUNDWATER MODELLING OF LAKE SIBAYA UNDER VARIOUS LANDCOVER AND CLIMATE SCENARIOS ADVISED BY PLANT WATER SOURCE PARTITIONING USING ISOTOPES	Water resources (Management)	Day 3	10:40-10:48
Mashala M	USING THE GOOGLE EARTH ENGINE CLOUD-COMPUTING PLATFORM TO ASSESS THE LONG-TERM SPATIAL TEMP DYNAMICS OF LAND USE AND LAND COVER WITHIN THE LETABA WATERSHED, SOUTH AFRICA	Soil, Land & Climate Change	Day 3	15:20-15:28
Mashiane KK	PREDICTING SPECIES RICHNESS AND DIVERSITY USING SATELLITE REMOTE SENSING AND MACHINE LEARNING ALGORITHMS	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	10:50-10:58
Masiloane M	CROSS-BORDER COOPERATION TO ENHANCE SOCIAL AND ECONOMIC DEVELOPMENT IN TWIN TOWNS: LESSONS FOR LADYBRAND AND MASERU	Resilient Cities & Communities	Day 4	10:10-10:18
Masithela TC	ASSESSMENT OF FUTURE GROWING DEGREE-DAYS FOR SOUTH AFRICA USING CORDEX REGIONAL CLIMATE MODELS	Climate smart agriculture(3)/Crops	Day 4	11:30-11:38
Matamanda RA	URBAN WETLANDS AND HUMAN ENVIRONMENTAL FOOTPRINT AND CONFLICT: CASE OF THE SEVEN DAMS CONSERVANCY, BLOEMFONTEIN	Water resources (Management)	Day 3	10:50-10:58
Mathoho M	ASSESSMENT OF THE EFFECT OF FIRE ON VEGETATION COMPOSITION AND COVER OF SPARSELY WOODED SAVANNA HABITAT IN BENFONTEIN NATURE RESERVE NORTHERN CAPE SOUTH AFRICA	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	11:00-11:08
Mbewu A	CHARACTERIZATION OF SPATIAL SOIL VARIABILITY AND ITS EFFECT ON SOIL ORGANIC CARBON STOCK IN MATATIELE, SOUTH AFRICA	Soil, Land & Climate Change	Day 3	14:20-14:28

Meyiwa S	ASSESSMENT OF AGRO CLIMATIC PARAMETERS ON MAIZE PRODUCTIVITY IN FREE STATE	Climate smart agriculture(3)/Crops	Day 4	11:20-11:28
Mkhwanazi IK	TREATMENT OF ANAEROBIC SLUDGE DIGESTER EFFLUENT USING PARTIAL NITRITATION-ANAMMOX PROCESS	Waste management	Day 3	10:20-10:28
Mkhwanazi SM	DEPLOYING A BATTERY MANAGEMENT SYSTEM TO A DRONE IN ORDER TO MAXIMIZE FLIGHT TIME.	DRONES	Day 4	Between 14:00 and 16:00
Mnkandla SM	PERFORMANCE OF A LABORATORY-SCALE FIXED BED MYCOFILTER IN THE REMOVAL OF A FOOD COLOURING AGENT FROM AN AQUEOUS SOLUTION	Waste management	Day 3	10:50-10:58
Mnqotho S	EFFECT OF ESTUARIES ON THE CONDITION INDEX AND MEAT YIELD OF THE BROWN MUSSEL PERNA PERNA	Climate Change & Biodiversity (Coastal)	Day 4	10:30-10:38
Moalusi TC	LEVERAGING HIGH-PERFORMANCE COMPUTING INFRASTRUCTURE FOR CLIMATE STUDIES	Technologies for Global Change	Day 4	12:50-12:58
Moeletsi ME	APPLICATION OF A HEAT UNITS FOR SUSTAINABLE MAIZE CROP PRODUCTION IN THE FREE STATE	ARC: Agriculture in a Changing Climate	Day 3	16:50-16:58
Mogale E	GRAIN SORGHUM-COWPEA INTERCROP: A CLIMATE-SMART APPROACH FOR ENHANCED PRODUCTIVITY UNDER A NO-TILLAGE SYSTEM	Climate smart agriculture(3)/Crops	Day 4	12:10-12:18
Mogebisa T	ESM-FORCED HYPER-HIGH RESOLUTION SEASONAL WIND SPEED PREDICTIONS AND IMPLICATIONS FOR THE RENEWABLE ENERGY IN A CHANGING CLIMATE	Alternative energy	Day 1	17:00-17:08
Mohale V	POVERTY ANALYSIS AND PREDICTION IN SOUTH AFRICA USING REMOTELY SENSED DATA	Resilient Cities & Communities	Day 4	10:50-10:58

Mokalusi OL	A FEASIBILITY STUDY TO DETERMINE FACTORS INFLUENCING DRONE DELIVERY ADOPTION: CASE STUDY OF BLOEMFONTEIN CENTRAL BUSINESS DISTRICT	DRONES	Day 4	Between 14:00 and 16:00
Moodly C	SOUTH AFRICAN CONSUMER PERSPECTIVES ON SUSTAINABLE FASHION	Resilient Cities & Communities	Day 4	11:00-11:08
Moriri SC	DROUGHT TOLERANCE ATTRIBUTES FOR PIGEON PEA [CAJANUS CAJAN (L.) MILLSPAUGH] VARIETIES AND P-FERTILIZERS IN DIVERSE AGRO-ECOLOGICAL ZONES	Climate smart agriculture(3)/Crops	Day 4	11:50-11:58
Motshekga LM	PASTURE DIVERSITY AND PLANTING DATE EFFECTS ON BIOMASS PRODUCTION FOR CLIMATE CHANGE ADAPTION OF FODDER PRODUCTION SYSTEMS	Climate smart agriculture(3)/Crops	Day 4	12:30-12:38
Mpanyaro Z	ASSESSING DROUGHT IMPACT ON RIPARIAN ECOLOGY AND LOCAL COMMUNITY ADAPTATION: A CASE OF BUFFALO RIVER CATCHMENT, EASTERN CAPE PROVINCE, SOUTH AFRICA	Water resources (Quality)	Day 4	14:40-14:48
Mphela. TM	DOES CLIMATE CHANGE AFFECT THE VIABILITY OF PLANTATION FORESTRY IN SOUTH AFRICA?	Climate smart agriculture (1)/Forestry	Day 1	17:10-17:18
Mpofu M	DELINEATING SEAWATER INTRUSION USING ELECTRICAL RESISTIVITY IN NDLAMBE COASTAL AQUIFER: IMPLICATIONS FOR GROUNDWATER QUALITY	Water resources (Quality)	Day 4	15:30-15:38
Mugandani R	SMALLHOLDER FARMERS' BEHAVIOUR TOWARDS CROP DIVERSIFICATION IN CHIVI DISTRICT, ZIMBABWE	Climate smart agriculture(3)/Crops	Day 4	12:50-12:58

Muhambe C	TRANSFORMING HUMAN SETTLEMENTS THROUGH AN URBAN RESILIENCE AGILE OPERATIONAL MODEL: CASE STUDY OF KHAYALIJHA IN-SITU INFORMAL SETTLEMENT UPGRADING, SOUTH AFRICA	Resilient Cities & Communities	Day 4	11:10-11:18
Muhammad Fiaz MFQ	DENGUE FEVER AND GLOBAL CHANGE	Health & Climate Change	Day 2	16:50-16:58
Musitha MD	DETECTION OF EVAPORATION TRENDS IN DRAINAGE STATIONS, LIMPOPO PROVINCE, SOUTH AFRICA	Water resources (Management)	Day 3	10:10-10:18
Muzuva M	CLIMATE RISK MANAGEMENT AND ESG PERFORMANCE: A CASE OF SELECTED BANKS IN SOUTH AFRICA	Business Adaptation to Global Change	Day 4	12:40-12:48
Mwadingeni L	PERCEPTION OF CLIMATE CHANGE AND COPING STRATEGIES AMONG SMALLHOLDER IRRIGATORS IN ZIMBABWE	Climate smart agriculture(2)/ Smallholder	Day 3	10:10-10:18
Ndaba Z	RESILIENCE AND SUSTAINABILITY OF CULTURAL FESTIVALS IN KWAZULU-NATAL, SOUTH AFRICA IN THE COVID-19 CONTEXT	Resilient Cities & Communities	Day 4	10:30-10:38
Ndiitwani M	PACKAGING OF SOUTH AFRICA'S CLIMATE CHANGE PLANNING DOCUMENTS FOR REPORTING AND COMMUNICATION TO THE UNFCCC	Managing Global Change	Day 4	15:00-15:08
Nduku L	GLOBAL RESEARCH TRENDS FOR UNMANNED AERIAL VEHICLE REMOTE SENSING APPLICATION IN WHEAT CROP MONITORING	DRONES	Day 4	Between 14:00 and 16:00
Nesengani EC	EXPLORING HOW EMPLOYEES LEARN ABOUT FOOD WASTE IN A FOOD PROCESSING COMPANY IN GAUTENG PROVINCE, SOUTH AFRICA.	Food security	Day 4	15:10-15:18

Ngcobo SI	A YIELD GAP ANALYSIS TO ASSESS THE VULNERABILITY OF COMMERCIAL SUGARCANE TO CLIMATIC EXTREMES IN SOUTHERN AFRICA	ARC: Agriculture in a Changing Climate	Day 3	16:30-16:38
Ngeva Z	PRODUCTION AND CHARACTERIZATION OF WATTLE WOOD BIOCHAR AS SOIL AMENDMENT AND A CARBON SEQUESTRATION POTENTIAL FOR EMERGING FARMERS IN TOYISE, EASTERN CAPE, SOUTH AFRICA	Climate smart agriculture(2)/ Smallholder	Day 3	10:30-10:38
Nkohla N	PHYSICAL FACTORS INFLUENCING THE TROPHIC COMPOSITION ON THE KELP HOLDFAST	Climate Change & Biodiversity (Coastal)	Day 4	10:40-10:48
Ntlangula S	SOCIO-ECONOMIC DRIVERS OF LAND-USE/LAND-COVER CHANGE ALONG WITH THE MITIGATION AND ADAPTATION STRATEGIES	Soil, Land & Climate Change	Day 3	15:10-15:18
Ntuli HI	CARBON DIOXIDE EMISSION RATES IN DIFFERENT LAND USE SYSTEMS OF THE LETABA CATCHMENT, LIMPOPO PROVINCE, SOUTH AFRICA	Soil, Land & Climate Change	Day 3	14:40-14:48
Nzuza Z	IMPACTS OF CLIMATE CHANGE IN THE ISIPINGO CATCHMENT: ETHEKWINI MUNICIPALITY, DURBAN SOUTH AFRICA	Water resources (Quality)	Day 4	15:20-15:28
Oaikhena M	RAPID FLOW CERAMIC FILTER IMPREGNATED WITH SILVER NANOPARTICLES – FABRICATION AND EVALUATION IN WASTEWATER TREATMENT	Waste management	Day 3	11:00-11:08
Oluwalana A	A THIRSTY CERAMIC FILTER/ BIOCHAR COMPOSITE FILTRATION DEVICE FOR EFFICIENT REMOVAL OF EMERGING SUBSTANCE OF CONCERN FROM WASTEWATER	Waste management	Day 3	10:30-10:38

Omotayo AO	EXPLORING THE NEXUS BETWEEN CLIMATE CHANGE ADAPTATION STRATEGIES AND INDIGENOUS PLANT'S PRODUCTIVITY IN SOUTH AFRICA	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	10:40-10:48
Omotso AB	CLIMATE CHANGE AND VARIABILITY IN THE SUB-SAHARAN AFRICA: TRENDS AND IMPACTS ON AGRICULTURE	Climate smart agriculture(1)	Day 1	16:50-16:58
Otunola B	A MESOCOSM STUDY ON THE APPLICATION OF CLAY MINERALS AND VETIVER GRASS FOR SUSTAINABLE SOIL AND WATER REMEDIATION OPTIONS	Water resources (Quality)	Day 4	15:40-15:48
Phungela TT	THE IMPACT OF CLIMATE VARIABILITY ON THE PH LEVELS AND ELECTRICAL CONDUCTIVITY OF CROCODILE RIVER IN NELSPRUIT, MPUMALANGA PROVINCE	Water resources (Quality)	Day 4	14:50-14:58
Rakotoarivelo AR	MADAGASCAR'S ANOMALOUS FIRE REGIMES SUSTAIN ANTHROPOGENIC LANDSCAPE DEGRADATION	Soil, Land & Climate Change	Day 3	15:00-15:08
Rasifudi T	ANALYSIS OF METEOROLOGICAL AND HYDROLOGICAL DROUGHTS IN THE VAAL RIVER CATCHMENT	ARC: Agriculture in a Changing Climate	Day 3	16:40-16:48
Sebati L	MORINGA OLEIFERA CARBON SEQUESTRATION AND AMELIORATION OF DEGRADED SOILS AS INFLUENCED BY DIFFERENT SOIL TEXTURAL CLASSES	Soil, Land & Climate Change	Day 3	15:50-15:58
Shange NT	THE HOLISM OF UBUNTU: THE MISSING LINK IN 4IR LED ENVIRONMENTAL JUSTICE SOLUTIONS	Technologies for Global Change	Day 4	12:40-12:48

Sithole MS	SOCIAL ENTREPRENUERIAL ENTERPRISE AS A SYSTEM TO ADDRESS THE NOTION OF "AFRICAN SOLUTIONS TO AFRICAN PROBLEMS"	Business Adaptation to Global Change	Day 4	13:00-13:08
Sithole N	FARMERS' PERCEPTIONS ON LAND AND WATER USE IN HYDROPONIC FARMING FOR AGRICULTURAL TRANSFORMATION WITHIN JOHANNESBURG INNER CITY	Climate smart agriculture(1)	Day 1	17:00-17:08
Sithole PN	INVESTIGATING LEARNING PATHWAYS IN AQUACULTURE PRACTICES TO INFORM SKILLS AND POLICY DEVELOPMENT AIMED AT JUST TRANSITIONS FOR SMALL-SCALE FISHERMEN	Food security	Day 4	15:40-15:48
Siyengo K	FOSTERING SOCIAL LEARNING FACILITATION PRACTICES FOR CATCHMENT MANAGEMENT: A CASE STUDY OF TWO CATCHMENTS IN SOUTH AFRICA	Water resources (Management)	Day 3	10:30-10:38
Slayi M	SMALLHOLDER CATTLE FARMERS' PERCEPTIONS AND WILLINGNESS TO PARTICIPATE IN DROUGHT-RISK REDUCTION: A CASE OF RURAL COMMUNITIES IN EASTERN CAPE, SOUTH AFRICA	Climate smart agriculture/(2) Smallholder	Day 3	10:20-10:28
Starke AP	SECONDARY VEGETATION PROVIDES A RESERVOIR OF NON-TIMBER FOREST PRODUCTS AND AGROFORESTRY SERVICE OPTIONS FOR FORESTRY PLANTATION SYSTEMS IN MAPUTALAND, SOUTH AFRICA	Climate smart agriculture(1)/Forestry	Day 1	17:20-17:28
Steenhuisen SL	EXPANDING RANGES OF INVASIVE ROSACEAE	Climate Change & Biodiversity (Vegetation & invasives)	Day 2	10:10-10:18
Swart-Van Biljon J	A ZERO WASTE WASTE MANAGEMENT ALTERNATIVE: CONSIDERING WASTE PICKER ORGANISATIONAL PRINCIPLES AND TWO ZERO-ORGANIC-WASTE-TO-LANDFILL CASES IN SOUTH AFRICA	Waste management	Day 3	10:40-10:48

Thaela-Chimuka MC	THE USE OF BASIC SCIENCES IN THE MODERN WORLD: A CASE OF ADOPTING AQUAPONICS AS A BASIC SCIENCE CLIMATE SMART TOOL TO CURB FOOD INSECURITY IN GAUTENG PROVINCE, SOUTH AFRICA	ARC: Agriculture in a Changing Climate	Day 3	15:40-15:48
Tonisi N	AN ANALYSIS OF SOCIO-ECONOMIC FACTORS THAT INFLUENCE LAND USE CHANGE (CULTIVATED AND BUILT-UP AREAS): THE CASE OF KEISKAMMAHOEK AREA, EASTERN CAPE, SOUTH AFRICA.	Soil, Land & Climate Change	Day 3	14:30-14:38
Tshabalala P	DESIGNING A DATA-DRIVEN DIGITAL TWIN FOR PREDICTIVE MAINTENANCE IN LAST-MILE DELIVERY DRONES	DRONES	Day 4	Between 14:00 and 16:00
Van Heyde KD	MACROPLASTIC POLLUTION IN THE JUJSKEI-HENNOPS-CROCODILE RIVER SYSTEM: WHAT TYPE, HOW MUCH AND WHERE DOES IT COME FROM?	Water resources (Quality)	Day 4	14:30-14:38
Vika V	ASSESSMENT OF WATER QUALITY OF MTHATHA RIVER IN EASTERN CAPE, SOUTH AFRICA	Water resources (Quality)	Day 4	15:10-15:18
Vilakazi BS	ENZYME ACTIVITY UNDER DIFFERENT TILLAGE TECHNIQUES AND N FERTILIZER MANAGEMENT IN DRY LAND AGRICULTURE.	Climate smart agriculture(3)/Crops	Day 4	12:00-12:08
Vilakazi SP	CHARACTERISTICS OF BIOCHAR TYPES FROM POTATO WASTE AND PINE-BARK AND THEIR IMPLICATIONS FOR CARBON STORAGE, NUTRIENT RECOVERY AND LIMING OF ACIDIC SOILS	Soil, Land & Climate Change	Day 3	15:30-15:38
Xayimpi O	LAND USE AND LAND COVER CHANGE CHARACTERIZATION IN MTHATHA RIVER CATCHMENT, EASTERN CAPE, SOUTH AFRICA.	Soil, Land & Climate Change	Day 3	14:50-14:58
Xelelo Z	SOLID METAL WASTE MANAGEMENT PRACTICES IN O.R. TAMBO DISTRICT MUNICIPALITY	Waste management	Day 3	11:10-11:18

WE HONOUR THEM

In 2020 and 2021 the global scientific community lost two top scientists – both exemplary leaders for their contribution to climate change research. In honour of Professor Maarten de Wit (1947 – 2020) and Professor Bob Scholes (1957 – 2021), a special tree Planting Ceremony will form part of the GCC5 to pay tribute to these outstanding people.

PROFESSOR MAARTEN DE WIT



Professor Maarten de Wit was an internationally acclaimed geoscientist who worked over several decades in numerous fields, including the evolution of the early Earth; Earth system processes and science trans-

disciplinarity. Professor de Wit's passion, commitment to geoscience education and development led him to occupy various prominent positions at research institutions around the world and the supervision of several hundred Master's and Doctoral graduates. His contribution toward the body of geoscience knowledge and understanding of the Earth is unrivalled and has assisted in the characterisation of numerous critical Earth processes and the development of applied geoscience solutions, especially on the African continent. Despite his European birth, he became an ambassador for the entire continent. His promotion of the 'Africa Alive Corridors' programme was inspirational, as it embraced science, culture, landscape in a positive, educational, pan-African context and a genuine attempt to embrace all African society.

PROFESSOR ROBERT (BOB) SCHOLES



Professor Robert (Bob) Scholes, one of the world's leading scientists on Climate Change, was Distinguished Professor of Systems Ecology and Director of the Global Change Institute (GCI) and at the University of the

Witwatersrand. He was a true leader, a conscientious and dedicated scientist, and a teacher to all. An A-rated scientist, he was among the top 1% of environmental scientists worldwide, based on citation frequency, and published widely in the fields of savannah ecology, global change, and earth observation. Professor Scholes led several high profile studies and held high profile positions in the fields of climate change and environmental studies globally. He was one of the lead authors in the assessment reports of the Intergovernmental Panel on Climate Change (IPCC) on the present and future impacts of climate change and how we can adapt to, or reduce it. He has also served as a member of the steering committees of several global earth observation bodies.