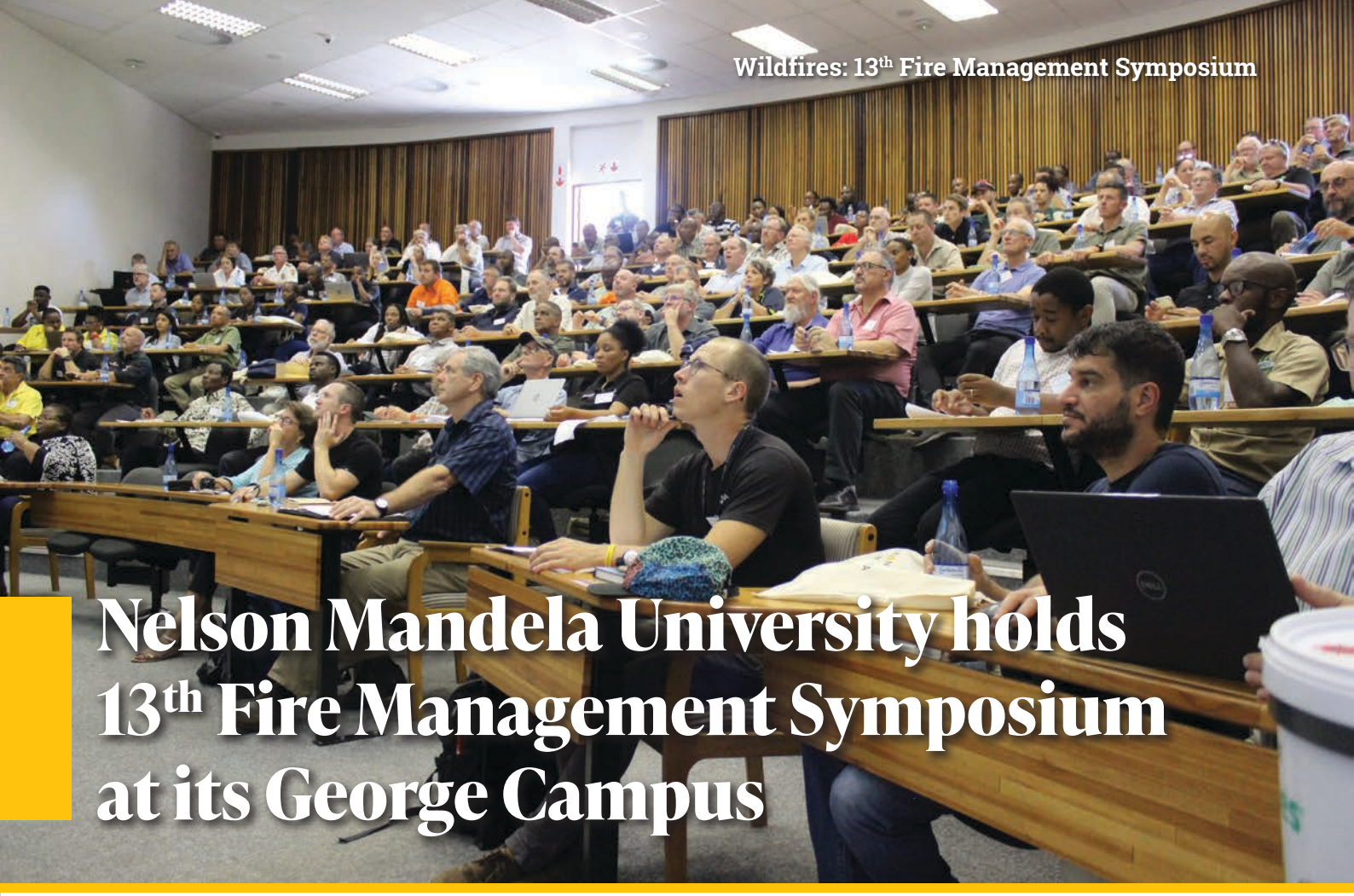


Nelson Mandela University holds 13th Fire Management Symposium at its George Campus

The Nelson Mandela University (NMU) George Campus held its 13th Fire Management Symposium on 23 to 25 November 2022 at its George Campus on the Garden Route. The symposium consisted of a two day conference as well as a field day to three separate venues with 24 presenters sharing their knowledge, research, data and experience.

The theme of the symposium was 'Preparing for the next mega/disastrous fire'. The main purpose of the event was to share information and compare notes between veldfire scientists, wildland fire managers and fire authorities that would indicate what have been done to offset unwanted, destructive wildland fires and to identify shortfalls in the preparation to face the next fire disaster.

Session One was chaired by NMU's Prof Jos Louw with a warm welcome from Tiaan Pool followed by the official opening by Dr Kaluke Mawila, campus principal at the NMU George Campus, who provided an overview of the NMU George Campus' Veldfire Management curriculum and its global networks.

Prof Peter Fulé of the School of Forestry in Northern Arizona University in the US provided the key note address, which was themed 'The missing link between research inputs and technical outputs'. Prof Fulé explained how integrated fire management (IFM) can be defined as the prevention of unwanted veldfires, protection of assets, human lives and the environment, suppression of unwanted veldfires, research and rehabilitation of areas affected by veldfires. The missing link in integrated fire management is a breakdown in communication between all role players, not using all available resources, including the human resource within the community, as well as failure to cross boundaries between management and research. IFM should take place on all spheres of state ie national, provincial and local. If the political will and support in any of these spheres are absent or poor, the potential of IFM will be limited. "How can we address the "missing link between research inputs and technical outputs"? The big picture issues remain essential and two-way communication is vital. In my view, the mobilisation of all our diverse resources ie human, disciplinary and technological, helps contribute to engaged, adaptive stewardship of the Earth and more equitable societies."

Greg Forsyth of the CSIR, now retired, discussed the current and future veldfire risk in the world and South Africa. In his presentation Forsyth provided insight into wildfires worldwide, the drivers of wildfires, recent wildfire events ie Europe, USA, Australia and South Africa, the fire paradox where stringent fire suppression policies are based on the belief that that fire can be totally excluded from any particular area, which in practice is not feasible nor ecologically desirable (Calkin et al. 2014), fire dependant ecosystems, wildfire risk and the usefulness of wildfire risk assessments. Forsyth said that the fire problem is increasing worldwide due to global weather changes and also because of poor land management. And that climate change is contributing to the problem. "A balance is needed between maintaining fire regimes and ensuring human safety but expanding ▶

development, especially in the WIU, is complicating fire management", said Forsyth.

Lee Raath-Brownie of Fire and Rescue International shared insights on the role and impact of the media on fire management in South Africa. She provided background information on a recent study done showing the differences in media impact of stories with and without the voice of scientists, highlighting the importance of the narrative given to the media during and after incidents. She also shared the importance of appointing a public information officer (PIO) as per the Incident Command System (ICS) and described the PIO dos and don'ts. Raath-Brownie shared the eight step communications model as per the ICS, which was sourced from Dynamic Incident Management. "Social media is a very powerful tool for PIOs. Know your media/journalists, both local and national and keep the narrative simple (KISS)", said Raath-Brownie.

Dr Izak Smit, senior scientist at SANParks continued the discussion around the media with his 'Fire as friend or foe: the role of scientists in balancing media coverage of fires in National Parks, siting his recent research project also mentioned in Raath-Brownie's presentation. Dr Smit said that the media influence attitudes and hence actions and expectations towards fire management, sharing his recent research and statistics on media headlines. He said that the research identified three biases and that the first bias focusses on the negative effects of fire and the second bias showed basic fire ecology concepts lacking with the third bias on reactive fire management as opposed to proactive fire management. "Media can be an important partner in educating society to have a more systemic understanding of fire. Both fire management practitioners and fire ecologists/scientists have a role to play a role to inform a nuanced narrative around fires", said Dr Smit. Fire managers are missing an opportunity to educate the man in the street and fail to prevent fire-anxious communities by not planning the messages that go out to the media.

Arno Pienaar of Montigny Investments/Bastion Security shared the Swaziland experience in his presentation 'An alternative (military) approach to fire management' and also making a statement about traditional insurance versus the security brought about by a unique fire management system. Pienaar said that their key to success is military appreciation, intelligence, staff selection and training, community relations and control with military appreciation determining a clear objective, identifying all elements of the situation and terrain and analysing and measuring each element of overall strategy, detection, reaction, suppression, command and control at the fire and in control room and mop up and patrols. Intelligence focusses on arson fires and the FDI with statistics providing the number of arson fires per district, day of the month, day of the week, time of day and phases of the moon. Pienaar highlighted the importance of building relationships with the community and staff selection and training. "To lead people is a science', said Pienaar.

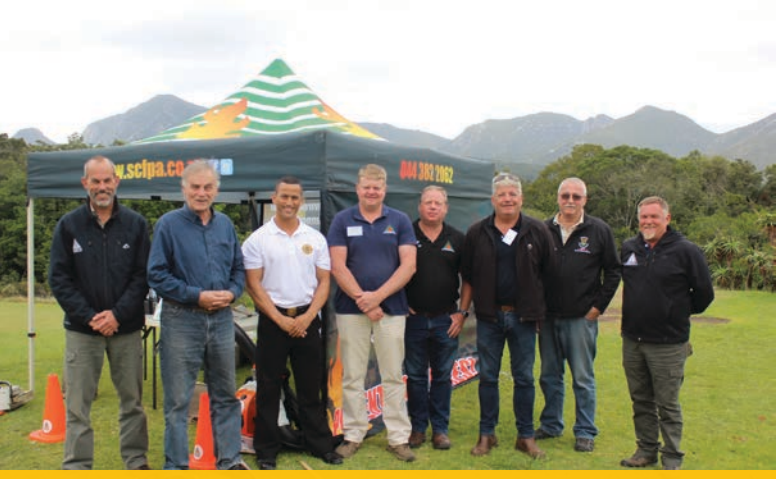
Prof Andrea Thode of the School of Forestry at Northern Arizona University in the US, who discussed 'Shifting the paradigms in wildfire training and education. Prof Thode shared the background and working of the Association for Fire Ecology (AFE), which was founded in 2020 and is an international organisation dedicated to improving the knowledge and use of fire in land management. She also included the Student Association for Fire Ecology (SAFE), the Wildland Fire Professional Certifications and the certifications programme. Prof Thode shared information on the North Arizona University (NAU) School of Forestry's Undergraduate Fire Ecology and Management Certificate and the Wildland Fire Education and Training Collaborative, which is based out of NAU to provide and connect fire science educators, trainers and the public with scientifically solid and peer-reviewed teaching tools and techniques, using state-of-the-art materials, which is free and accessible to all. She added that the World of Wildland Fire is a movable textbook of videos for use in trainings and education.

Session Two was chaired by NMU's Dr Muedanyi Ramantswana and started off with Trevor Abrahams of Working on Fire, whose presentation focused on 'Wildland fires and climate change: emerging trends, challenges and imperatives. Abrahams provided an overview of the Working on Fire (WoF) programme and objectives, saying that the EPWP Programme had grown from 850 in 2003 to 5 300 members in 2022. Abrahams also provided an over view of WoF Aviation, Training Academy and Fleet Management. He discussed Global Wildland Fire Management, the recently held IAWF Fire and Climate Conference in Pasadena in the USA and climate change and wildfires in South Africa. "The imperatives for South Africa is to address wildland fire management capacity through trained fire fighters, aerial fire fighting capacity, fire protection (FPA) capacity, the uniform implementation of ICS and refresher training and better integration between fire brigade services and wildland fire management services. We need to focus on focus on prevention, better use of weather forecasting in integrated fire management (IFM) and increase applied wildland fire management research" said Abrahams.

A presentation by Ian Pienaar of Montigny Investments in Swaziland followed that shared their information on the use of sniffer dogs to catch arsonists. Pienaar discussed the role of K9 teams in the fight against arson fires saying, "A well trained K9 team will have a massive impact on fires and crime in your area. It must be a team dedicated for this purpose only and the ongoing training program and operations must be controlled in detail and constantly to ensure the outcomes required." He also shared why this K9 programme is so successful, as the handlers and K9s are highly trained. This team is dedicated to do this job only and can't be doing other work as the training of these dogs never stops. Every aspect of training and operations is controlled in detail to ensure that the quality stays high and the outcomes are reached.

The Working on Fire Team

Laura Gannon of Meridian Urban Brisbane discussed 'Planning-based bushfire risk assessment by translating risk into land use planning practice. Gannon discussed the cross-dimensional challenges, integrated approaches, the value of land use planning in hazard risk management, dealing with fire risk, shared some case studies and detailed land use planning tools. "Ultimately we need multi-disciplinary and multi-jurisdictional collaboration, a balance between evidence-based decision making and the precautionary principle, holistic and sustainable landscape



The DFFE and Southern Cape FPA team

The Eastern Cape FPA team

- stewardship, improved linkages with research, transport planning, emergency management processes, building regulations, transitioning hazard and risk to front-end of planning considerations and ensuring climate projections are factored in", said Gannon.

Paul Gerber of the Department of Forestry, Fisheries and the Environment, shared 'The responsibility of fire protection associations (FPAs) to prepare communities for mega fires. "Veldfires are a matter of common concern. For this reason, in South Africa as in other countries, effective policies and plans for preventing and combating veldfires, must be clear about individual responsibility as well and cooperative and coordinated roles and responsibilities", said Gerber. He shared the impact of the Knysna fires and detailed the strategic objectives identified by the Vulcan workshop to be implemented by all role players and highlighted what we cannot change such as climate change and the key issues to be addressed to prevent mega fires through coordination and cooperation. Gerber mentioned funding and the effective fire management integration by FPAs, with the main focus on prevention. "What we can manage is prevention and our fuelloads", said Gerber.

Pam Booth, environmental manager in Knysna detailed the eco-friendly fireproof buildings that were constructed recently. Houses that are built in the urban interface areas ie where the urban area and natural areas meet, are at risk of burning down when there are mega fires. These houses must be designed to be fire resilient and the use of fireproof building material for construction should be promoted.

The Friday's first session was chaired by NMU's Dr Tatenda Mapeto and featured a key note address by Working on Fire's Piet van der Merwe, who discussed preparing for the next disaster fire. "Integrated fire management (IFM) refers to a systematic, holistic approach to managing wildfires and includes five elements, also referred to the five Rs ie reduction (aligned to prevention), readiness (protection and preparedness), response (strategies and tactics to suppress a fire) recovery (lessons learnt and rehabilitation of damage) and research (data collection and analyses to solve wildfire challenges). Working on Fire (WoF) has developed the IFM wheel encompassing the five elements." He concluded, "Preparing for a disaster fire should be an IFM approach by all stakeholders. Individual landowners may have some or all of the IFM elements in play but they cannot be as strong on their own as when they collaboration with their neighbours, between FPAs and other organisations. Fires don't respect cadastral boundaries and IFM shouldn't either. Wildfire is a science and IFM should have a sound scientific base for effective and practical management."

This was followed by Val Charlton of Land Works, who shared the results of the survey done on fire protection association readiness. The recommendations Charlton shared included that Umbrella FPAs need to be well resourced, for the public good and their performance managed by the Advisory Forum, which can play a critical independent role. There should be a focussed (pressurised) intervention to get state landusers to become members. Revisit the independent Advisory Forum's strategic role in South Africa. Develop a five year funding partnership with key private sector stakeholders to develop a convincing value proposition for membership at local, provincial, national level. Influence communication and practices to align to biodiversity stewardship, disaster risk reduction, climate adaptation and thus play to Government's priorities. Develop and maintain a comprehensive and information-rich website for the Advisory Forum to service landusers, FPAs, public etc.

The Western Cape Government's Etienne du Toit provided insight, with some strong questions asked, on preparing a metropole for the next mega fire. Du Toit said, "A cohesive wildfire management strategy rests on three pillars: creating fire-adapted and resilient landscapes; building fire-adapted human communities and a safe and effective wildfire response. The circle rests on the jurisdictional cycle of cooperation and collaboration among local, provincial and national

An evening spent with industry friends

entities and their affiliates." Du Toit discussed the current realities of mega fires, saying, "We cannot suppress megafires, we simply manage the consequences. Be prepared for the worst. Be prepared to lose multiple structures, blocks and suburbs. Not all properties can or will be saved. Acknowledging that you have a risk is the first step. People tend to think of WUI fires as a forest health problem or a fire department problem and it really is a community problem." He also detailed the wildland urban interface and strategy saying, "The most effective form of structure defence is to suppress the wildland fire. Perimeter control must be the number one operational priority utilising established wildland fire fighting tactics to suppress the fire before it reaches structures. The key to success in the wildland urban interface is preparation and pre-incident planning."

Mondi South Africa's Deon Greyling, shared information on whether commercial forestry companies are ready for the next mega fire. Greyling shared the five pillars underpinning the Mondi fire strategy: fire prevention, fire protection or state of physical readiness, fire suppression, fire investigation and community and contractor relations adding that fuelload influences all five pillars. He detailed each and shared Mondi's fire suppression achievements, saying that the international benchmark was surpassed in nearly all respects. He showcased their significant safety and ergonomic interventions ie vehicle protection, bakkie sakkies, auto reels and bumper turrets and thermal curtains and the introduction of double cab tenders, designed around small crew size of four to five. Mondi also invested in compressed air foam systems (CAF) technology to ensure faster fire suppression and excellent post-extinguishment protection, which exceeded their expectations. Other technology includes the use of mechanised mop-up thermal cameras and remotely piloted aircraft system (RPAS). Greyling concluded, "If you are always ready, you don't have to get ready!"

A presentation by Dr Rachel Loehman, a research landscape ecologist at the US Geological Survey, Alaska Science Centre on 'Fuel modelling - a basis for fuel management intervention, followed. Dr Loehman explained what are wildland fuels, saying that fuels are the most important environmental factor in fire management and that fuels determine fire effects. She added that it is important to measure fuel properties in order to predict and manage fire behaviour and effects. She explained the visual fuels estimation method ie photoload and LiDar. She also discussed the emerging issues surrounding fuels, fire and fynbos, adding that the paths forward include fuels and fire behaviour characterisation, empirical fire effects studies and predictive modelling with monitoring.

CapeNature's Dr AnneLise Schutte-Vlok discussed prescribed burning, the right option in Fynbos? Dr Schutte-Vlok said that the fire season and intensity usually go hand in hand ie quick hot fires versus slow, cool ones. "Retaining the biodiversity in an ecologically healthy state will result in a sustained flow of high quantity and quality water", she added. Soil-stored seed from large-seeded ant- and rodent-dispersed species eg Mimetes, Leucospermum spp. need hot, intense, clean fires while low-intensity fires favour small-seeded, often weedy pioneer species eg Helichrysum, Stoebe spp. and Kystervaring (Gleichenia). Repeated low-intensity fires result in increase in these spp. which will increase flammability of the veld at early age due to large loads of fine materials. The veld ignites more easily resulting in shorter fire return interval and loss of slow-maturing species. Dr Schutte-Vlok said that the fire management plan must identify areas of concern and clear aliens, include awareness raising campaigns, ensure firebreaks are in place and restrict developments in fire-prone areas.

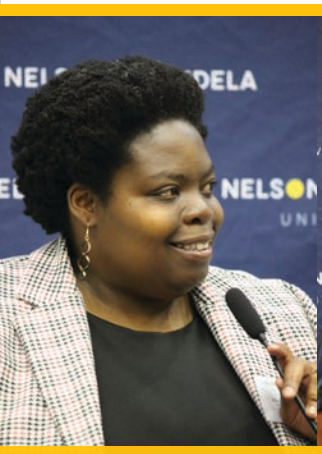
Sappi Southern Africa's Jeffrey le Roux shared the effect of veldfires on the small and medium timber growers. Small ▶

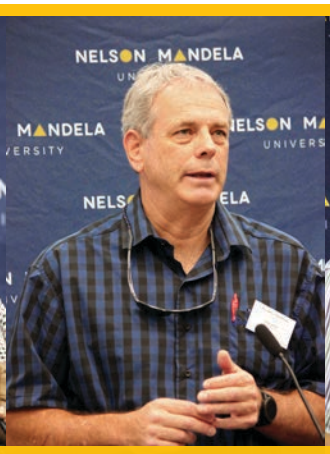
The Southern Cape FPA's field day

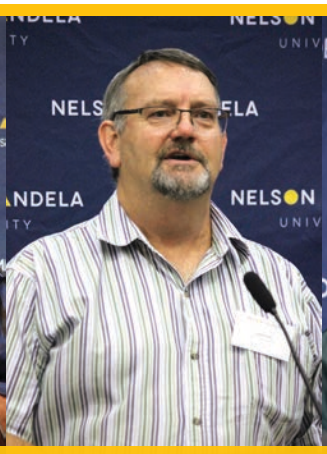
growers comprises of 3,8 percent of the forestry industry, while medium growers has 14,6 percent of the forestry area. Le Roux said that a mega fire needs to only be a hectare to have severe impact on someone's livelihood; the impact of fire is dire for small and medium growers. Medium growers are better placed currently as opposed to small growers. We need to prepare for the bad day that we know is coming. "Ensure that the basic principals of fire prevention and preparation are practiced to mitigate fire damage as much as possible. Responsibility ultimately lies with the landowner. Sustainability of current and emerging small and medium growers is going to be very reliant on continued support from more experienced role players within the industry", said Le Roux.

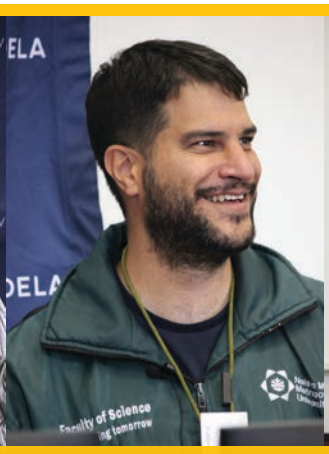
A joint presentation by EnviroVision Solutions (EVS) Systems' Dr Gavin Hough and FireWeb's Noel Harrison followed, who discussed how the integration of early detection and rapid response can mitigate the risk of mega/disastrous fires. Dr Hough described how the EVS fire detection camera system works and its benefits. He also explained the ForestWatch Mobile App and its features which include finding fires, new fire notifications, weather and FDI/FDR forecast, views from the cameras, GeoSpatial and satellite overlays and FireWeb integration. FireWeb's Harrison then detailed the hand over from early warning systems into the rapid response or initial attack component and post incident analysis. "Most organisations we have worked with produce an annual operational plan and we looked at how we could incorporate the plan into tools suitable for initial attack users. The tool we developed to support this allowed users to define the weighted response in terms of resource, either by type or specific unit, personnel by role and qualification as well as we enabled the ability to setup varied rules based on regions or geography", said Harrison. "All information can be linked to the incident report and can be used for analysis purposes post incident. We have worked heavily with industry to define standard reporting templates and options to ensure we align our information gathering efforts", he said.

The second session on Friday was chaired by NMU's Barry Muller with Dr Jo Barnes who discussed the pollution of ground water from fires and fire suppression. Mega fires have a devastating effect on groundwater as fire changes the composition of vegetation as well as soil vulnerability of the landscape. Natural vegetation is often replaced by invader species that use more water. Dr Barnes said that groundwater and fires are like a two-way street: The state of groundwater affects risk and the extent of wildfires and wildfires have serious effects on the state of the environment, including groundwater. Dr Barnes highlighted the importance of groundwater adding that two-thirds of South Africans rely on groundwater as their primary source of water. It is not only used for drinking and sanitation but also to support livelihoods, agriculture, ecosystem health and industrial growth. "Research has shown that when a wildfire occurs during a hydrological drought, almost 10 times more land is burnt than during a non-drought year."


Dr Kaluke Mawila


Prof Jos Louw


Tiaan Pool


Hannes van Zyl


Sonia Roets

Prof Keith Little, who shared research information on pelargonic acid as a replacement for paraquat for the preparation of firebreak tracer-lines. “Paraquat is a robust chemical with consistent performance over a range of vegetation types. The rate of application with pelargonic acid is important and the vegetation type and cover has an influence on desiccation. It is able to burn and a suitable alternative to paraquat”, said Dr Little.

Avelile Cishe, an NMU postgraduate student discussed alternative fuel management methods in South Africa. “Fuelload management is the best insurance in wildfire management and fuel availability contributes to fire behaviour”, said Cishe. He shared some fuelload management techniques and fuelload reduction selection criteria. “Integrated fire (fuel) management is key and should form part of the climate adaptation and mitigation strategy. More research needs to be done on various fuelload management techniques”, he said. “The integration between research outputs and technical application is critical”, concluded Cishe.

Angel Goldsmith, a PhD candidate in Geography Research at Leverhulme Centre for Wildfires Environment and Society, King’s College in London, discussed the missing link in wildfire emergency management in South Africa: early warnings and information dissemination. His research includes to identify communication gaps and lessons from recent mega fires, to review communication research and international practice in wildfire risk communication and to propose a framework to improve fire risk communication and resilience for South Africa. He cited some of the international best practices, the four conceptual models of risk communication, fire risk communication typology in order to improve theories guiding the design of fire risk communication strategies and to better inform the community of emergency evacuation procedures.

NMU’s Hannes van Zyl provided an overview of the Friday’s sessions and Tiaan thanked all the participants, exhibitors, presenters and delegates for their support.


Lunch time!

Unique gifts for the presenters

The field day trips included a visit to Pinnacle Point, an archaeology site occupied by Middle Stone Age people between 170 000 and 40 000 years ago and the Dias Museum in Mosselbay; a visit to Prins Albert via the Swartberg Pass, a pristine Fynbos landscape and the Southern Cape Fire Protection Association’s field day, with visits to the EVS camera system, BioChar, activated charcoal research and some site visits of the Knysna burn scars and rehabilitation.

View the full photo gallery