52nd Congress of the

Southern African Society for Plant Pathology

Future Africa, University of Pretoria *1 - 3 AUGUST 2022*

Southern African Society for Plant Pathology

2022

PROGRAMME & BOOK OF ABSTRACTS

SASPP

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Foreword from Director of FABI and Innovation Africa @ UP

The 33rd Annual Congress of the SASPP in Thaba 'Nchu in 1995 was the first scientific congress I attended. It left a lasting impression on me. The seriousness of the science, the mixed playfulness and fun of the interactions amongst the participants especially stood out at that early stage of my career. These impressions have remained a feature of the SASPP conferences for me ever since then. Much like the many other scientific society meetings that I now attend, the SASPP congress taught me much about the importance, and complexity, of the scientific community; and how important these meetings are in sharing knowledge, stimulating ideas, and connecting people in the interests of advancing the discipline.

It was with a sense of appreciation for what SASPP has meant to me and a sense of stewardship to the Society that I offered, on behalf of the FABI team, at our last congress at Club Mykanos to host the 52nd SASPP in January 2021. We envisioned that it would be an opportunity to reflect on the end of the UN International Year of Plant Health. We were all so excited at the opportunity of what IYPH2020 offered - a global stage to celebrate and advance the discipline of plant pathology and the critical role that it must play in food, fibre and environmental security.

Unfortunately, our plans for a meeting linked to the UN International Year of Plant Health did not materialize as we had hoped. SARS-CoV-2 emerged to challenge us, and we have all subsequently been through the most horrible experience with COVID-19, including the tragic loss of loved ones and close colleagues. SASPP 2021 could be held in person. While we had a successful online event that January, there is no way that it could replace the special nature of our SASPP conferences. As a small conciliation, we have all learned about the online hosting of meetings and will now be able to incorporate that learning into future conferences.

It is thus with absolute delight and great excitement that we can now finally welcome you to our home, here in Pretoria, for the actual 52nd SASPP congress. We are fortunate to have an exceptional line-up of high-quality keynote speakers, both local and international. And we have an excellent representation from institutions and industries around the country. Thank you for joining us!

FABI celebrates its 24th year of existence in 2022. We are proud of the exceptional record of research excellence and education that the institute has achieved over that period, much of it focused on Plant Pathology. We have not achieved this alone; rather it is due to our collaborations both in South Africa and globally that we value deeply. It is for that reason that FABI provided a natural base of support for the development of Future Africa, which now hosts this conference.

Future Africa aims to serve as a hub that connects researchers across the continent of Africa and globally. This is also important for Plant Pathology. Plant health in South Africa is deeply interconnected, physically and through research networks, to the rest of the continent. Strengthening these networks across Africa concerning this topic is of the utmost importance for the future development of the continent. In this regard, we are also excited to partner with Nature Africa as part of the SASPP 2022. Nature Africa provides a prominent global platform for the communication regarding African Science. It is clear that their involvement will help to promote the discipline of Plant Pathology on the continent.

In closing I wish to express my sincere appreciation to Prof Noëlani van den Berg and the rest of the FABI team that have been involved with the organization of this conference. As with all congresses, such endeavors require an enormous amount of time and energy. Noëlani and her team have taken up this challenge with passion, dedication and to the highest standards. The Carlamani Conferences & Events team has been exceptional partners on this journey, and we thank them for their quality support. We are also grateful to all our sponsors and supporters who have made this event feasible financially and in terms of its impact and reach.

We trust you will have a stimulating and memorable scientific and personal experience at SASPP 2022. And that this will reinforce our relations and strengthen the foundations of Plant Pathology, which is such a critical discipline in Africa.

Bernard Slippers
Director of FABI and Innovation Africa @UP

Noëlani van den Berg
Chair and Associate Professor
Hans Merensky Chair in Avocado Research
FABI, University of Pretoria

Prof Sophien Kamoun

Sophien Kamoun is a senior scientist at the Sainsbury Laboratory and professor of biology at the University of East Anglia (UEA) and is known for contributions to our understanding of plant diseases and plant immunity.

He used genomics and molecular biology methods to obtain insights into the biology and evolution of eukaryotic plant pathogens. He discovered virulence effector families from plant pathogens and showed how they can modulate plant immunity. He demonstrated how antagonistic coevolution with host plants has impacted the architecture of pathogen genomes, accelerated the evolution of effector genes, and drove the emergence of immune receptor networks.

After his PhD, Kamoun worked at the National Science Foundation (NSF) Center for Engineering Plants for Resistance Against Pathogens at the University of California, Davis, and at the Department of Phytopathology (Wageningen University, Netherlands). He was on the faculty of the Department of Plant Pathology (Ohio State University, Wooster campus) from 1998 to 2007, before joining The Sainsbury Laboratory in 2007. He served as Head of The Sainsbury Laboratory from 2009 to 2014 and also holds the rank of professor of biology at the University of East Anglia. Kamoun served as president of the International Society for Molecular Plant-Microbe Interactions from 2012-2014.

Reflections of a restless plant pathologist

Sophien Kamoun
The Sainsbury Laboratory, Norwich, NR4 7UH, United Kingdom

A fundamental concept in plant pathology is that most plants are actively resistant to most pathogens and pests. Plants fend off biotic foes primarily through immune receptors that detect invading pathogens to trigger a robust immune response. The conceptual basis of such interactions was elegantly articulated by Harold Flor, who back in 1942 proposed the hypothesis that single genes in plants and pathogens define the outcome of their interactions. Flor's gene-for-gene model turned out to be hugely insightful and influential - it has, ever since the mid-twentieth century, helped to guide applied and basic research on disease resistance. However, recent findings are taking the field far beyond this binary view of plant-pathogen interactions. Plants turned out to carry diverse repertoires of immune receptors that are interconnected in complex ways. The emerging paradigm is that dynamic webs of genetic and biochemical networks underpin early stages of plant-pathogen interactions. I will discuss our work on NLR networks and explore the implications of this systems view of plant-pathogen interactions. We have postulated that Flor's intuitive gene-for-gene model is superseded by the systems view that plant immune receptors form networks with complex topology. Current activities aim at decrypting the regulatory pathways that modulate receptor network wiring. Ultimately, an improved knowledge of plant immune systems would enable optimal deployment of immune receptors in agriculture.

Prof Anne Pringle

Anne Pringle was born in Kuala Lumpur, Malaysia, and spent her childhood traveling through Southeast Asia and West Africa. After being dragged along on one-too-many birding expeditions, she abandoned the birds for fungi. She was an undergraduate at the University of Chicago, and then completed a PhD in Botany and Genetics at Duke University. After completing a Miller Institute for Basic Research in Science Fellowship at the University of California, Berkeley, she joined the faculty at Harvard University. She next moved to the University of Wisconsin, Madison, where she is now Vilas Distinguished Achievement Professor in the Departments of Botany and Bacteriology.

Pringle has given over 100 invited talks to academic and popular audiences in countries including China, Colombia, France, Singapore, Sweden, Thailand, and the United States.

She has been awarded the Alexopoulos Prize for a Distinguished Early Career Mycologist (2010), the Mendelsohn Excellence in Mentoring Award from the Harvard University Graduate Student Council (2011), the Fannie Cox Prize for Excellence in Science Teaching from Harvard University (2013), and a Radcliffe Institute for Advanced Study Fellowship (2011-2012).

Her research has been featured by the New York Times, National Public Radio, Slate, and the Wisconsin State Journal, among others.
In 2019, Pringle was elected President of the Mycological Society of America.

Her talks about fungi, invasion by death caps, and the microbiomes of pitcher plants, are available on the ibiology website: htttps://www.ibiology.org/speakers/anne-pringle/

Rethinking Baker's articulation of an "ideal weed" with fungi: What enables a symbiotic fungus to invade?

Anne Pringle
University of Wisconsin Madison, USA

As global change reshapes Earth's biodiversity attention is focused on plants and animals and the diseases that kill them. Nearly ignored are the changing distributions of other microbes, including symbiotic fungi. The ectomycorrhizal a death cap, *Amanita phalloides*, is native to Europe and invasive in North America. Long ago, Herbert Baker articulated his vision of an "ideal weed": using a few species as case studies (e.g. the plant *Ageratum conyzoides*), he identified the characteristics of invasive plants. An "ideal" weed would grow quickly, flower rapidly and reproduce copiously; it might possess allelochemicals; it would be self-compatible but not completely so. Taking a similar approach, we are using the death cap as a model to articulate an "ideal" fungal invasive, basing analyses on population genomics data generated from an invasive Californian population and from across the European range. We have discovered death caps use vegetative growth, perennial reproduction, and copious sporulation as tools to spread. The secondary metabolites underpinning the death cap's toxicity are hypothesized to defend against insects, nematodes, and other animals.

We have discovered these toxins are as diverse in California as they are in Europe, and the MSDIN genes underpinning toxicity experience strong natural selection. The dynamic evolution of the MSDIN pangenome underscores its potential to mediate ecological interactions. Finally, death caps use multiple strategies to reproduce, and in the invasive range we find mushrooms generated from mycelia made up of a single nucleus (homokaryons) as well as mushrooms produced from canonical dikaryotic mycelia. Ours is the first observation of "mushrooms without mating" in nature. The distinctive features of invasive *A. phalloides* echo the characteristics of an "ideal weed", and parallels between the two kingdoms enable identification of general rules.

Prof Eva Stukenbrock

The research of Eva Stukenbrock focuses on the ecological interactions and co-evolution of fungi associated with plants. Since her PhD at the ETH in Zurich, she has used the plant pathogenic fungus *Zymoseptoria tritici* as a model to study pathogen evolution. During her post doc at Aarhus University, Denmark she worked with Prof. Mikkel Schierup to apply whole genome coalescence analyses to infer the speciation history of *Z. tritici* and related *Zymoseptoria* species. In 2010, she was appointed group leader at the Max Planck Institute for Terrestrial Microbiology in Marburg, Germany, and since 2014 she is a Max Planck Fellow and professor at Kiel University.

Her group integrates computational biology with experimental and molecular approaches to study mechanisms of host specialization of plant pathogens.

Microbial interactions and co-evolution in the plant phyllosphere

Eva H. Stukenbrock
Environmental Genomics, Botanical Institute, CAU Kiel and MPI for Evolutionary Biology, Plön, Germany

Plants are associated with a variety of microorganisms. Some microbial species are highly specialized to a plant-associated lifestyle and play a detrimental role in plant health either by promoting growth or conferring disease. In spite of their fundamental importance, we know surprisingly little about the evolution and biology of these microbial species. We use the fungal grass pathogen *Zymoseptoria* spp. as a model system to study microbial speciation and host specialization by integrating experimental and computational approaches. The species *Z. tritici* has co-evolved with wheat during domestication. Host specialization of this pathogen has involved the acquisition of adaptive substitutions in pathogenicity-related genes and changes in gene expression. Using a metabolomics approach, we demonstrate that *Z. tritici*, in susceptible hosts, is able to suppress and manipulate multiple biosynthetic pathways of wheat and notably pathways involved in immune responses during infection. Interestingly, suppression of the plant immune responses conferred by *Z. tritici* is so efficient that it impacts the ability of other microbial species to colonize the plant tissue, even in distal areas of the leaf not colonized by the fungus. Consistent with this observation we find that *Z. tritici* produces a large diversity of anti-microbial compounds, which may be important for the pathogen to co-exist with the wheat-associated microbiota. Our findings suggest that host specialization of pathogens not only entail specialization to a given host, but also to the host microbiota.

Keynote Address 2

Prof Almuth Hammerbacher

Almuth Hammerbacher studied at the University of Pretoria, where she graduated with an MSc degree in 2006. She moved to Germany and conducted research on interactions between bark beetle-associated fungi and conifer trees at the Max Planck Institute for Chemical Ecology (MPI-CE). After completing her PhD in biochemistry in 2011, she did a short postdoctoral fellowship before becoming a project group leader at the MPI-CE. Her research focused on the chemical interactions between microbes, insects and plants.

In 2016, Almuth moved back to Pretoria, for a research fellowship hosted by Prof Brenda Wingfield. Here she started a research project on the chemical interactions of South African plantation tree species and their most important pest and pathogens. One of her main foci is the development of methods for phenotyping resistant trees. Currently Almuth is employed as an associate professor in the Department of Zoology and Entomology at the University of Pretoria.

Auxin as a virulence factor in fungi causing Ceratocystis wilt in woody hosts

***Almuth Hammerbacher*[1], *Irene Barnes*[2], *Arista Fourie*[2], *Tuan Duong*[2], *Magriet van der Nest*[2], *Mike Wingfield*[2], *Brenda Wingfield*[2]**

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Fungi of the *Ceratocystidaceae* and more specifically the genus *Ceratocystis* are plant pathogens that cause vascular wilt diseases or root/tuber rot. An indole-3-pyruvate monooxygenase was recently identified in *Ceratocystis* which was present in species causing disease in woody hosts. Characterization of this gene revealed its involvement in auxin biosynthesis. Auxin, a plant growth regulator, was produced by a subset of these species in culture as well as during host infection and colonization. Exogenous application of auxin to host trees prior to inoculation increased their susceptibility to infection and resulted in larger stem lesions. To dissect the mode of action of auxin as a potential virulence factor in these fungi, *Eucalyptus* trees were inoculated with a high and a low auxin producing strain of *Ceratocystis eucalypticola*. Molecular and phytochemical analysis revealed that auxin production by this fungus correlated positively with the biosynthesis of the defense hormone jasmonic acid, downstream up-regulation of many common jasmonate-induced defense genes and the production of phenolic secondary metabolites. However, high levels of fungal auxin production also induced the transcription of gene-families involved in loosening of the cell wall and down-regulation of the ethylene biosynthesis pathway. These results reveal that *Ceratocystis* species use auxin as a virulence factor to manipulate cellular structure and halt pathogen-induced senescence processes when infecting woody hosts.

Dr Petra Boevink

The focus of her research is the cell biology of plant-pathogen interactions. The majority of our work focusses on the notorious oomycete pathogen *Phytophthora infestans*, the causal agent of the devastating potato late blight. They also have an interest in tree pathogens such as *P. kernoviae*. She works closely with Paul Birch (University of Dundee) and Steve Whisson (The James Hutton Institute) and other members of the strong *Phytophthora* team in Dundee. *Phytophthora* pathogens manipulate plant defence responses on multiple levels, suggesting complex exchanges of signals and a variety of effector functions. They have been at the forefront of pathogen effector studies for more than a decade and continue to explore the wide range of effector activities and what they reveal about plant defence. More recently they have been working on the mechanisms behind effector delivery and uptake. She is an active member of the Dundee Effector Consortium which encourages collaboration and exchange between teams working on plant interactions with a variety of organisms.

She completed her degree at the Australian National University in Canberra, and then did PhD in Plant Virology, based at CSIRO Plant Industry, Canberra. She then moved to Scotland and initially worked on the plant secretory pathway, plant virus movement and plasmodesmata. Thereafter she moved into *Phytophthora* research were there was a great opportunity for cell biology in the field (and they are fascinating pathogens).

Entering via the front door: cytoplasmic effectors taken into host cells via endocytosis

*Haixia Wang[1], Shumei Wang[1,2], Wei Wang[1], Lydia RJ Welsh[3], Marek Gierlinski[4], Stephen C Whisson[3], Piers Hemsley[1,3], **Petra C Boevink[3]**, Paul RJ Birch[1,3]**

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[2]Department of Microbiology and Plant Pathology and Center for Plant Cell Biology, Institute for Integrative Genome Biology, University of California, Riverside, California 92507, USA
[3]Cell and Molecular Sciences, James Hutton Institute, Errol Road, Invergowrie, Dundee DD2 5DA, UK.
[4]Data Analysis Group, Division of Computational Biology, School of Life Sciences, University of Dundee, Dow Street, DD1 5EH, Dundee, UK.

The *Phytophthora* genus includes many devastating plant pathogens which threaten food security, forestry, and the natural environment. An essential factor for infection success of many pathogens is the delivery of effector proteins into host plant cells to modulate plant defence and promote disease. These are referred to as cytoplasmic effectors, to distinguish them from effectors that are active in the apoplast surrounding host cells. A key group in *Phytophthora* is the RXLR class (named for a conserved protein sequence motif), which includes many avirulence and essential activities. While in bacteria there are specific mechanisms like the type three secretion system for delivery of effectors into host cells, how effectors from filamentous eukaryotic pathogens are translocated is still being unravelled.

One of the major questions is: How do these cytoplasmic effectors enter host plant cells after secretion? We have comprehensive evidence that *P. infestans* RXLR effectors are taken into plant cells via clathrin-mediated endocytosis (CME). Confocal imaging reveals that fluorescently tagged forms of key components of endocytosis; clathrin and the early endosome (EE) marker Ara6, expressed in infected plant cells, are associated with vesicles around *P. infestans* haustoria. Silencing the expression of either clathrin or Ara6 in *Nicotiana benthamiana* plants reduces *P. infestans* infection and reduces translocation of fluorescently tagged RXLR effectors into infected plant cells. Endosome enrichment procedures followed by immunprecipitation of clathrin- or Ara6-associated vesicles co-immunoprecipitates an RXLR effector but not an apoplastic effector from plants infected with transgenic P. *infestans* lines expressing tagged forms of these effectors.

Proteomic analyses of proteins co-immunoprecipitated with Ara6-labelled endosomes from leaf infection revealed enrichment of host proteins associated with endocytic vesicles along with multiple RXLR effectors. This indicates that uptake of these RXLRs into plant cells occurs via CME.

Keynote Address 4

Prof Paul Birch

Paul Birch is Professor of Plant Pathology and Head of the Division of Plant Sciences at the University of Dundee in Scotland, UK. He has worked at Dundee University and at the James Hutton Institute (previously Scottish Crop Research Institute) for 27 years. His group mainly studies effector proteins from the potato late blight pathogen, *Phytophthora infestans*. *P. infestans* is an oomycete, a eukaryotic pathogen with a fungus-like lifestyle that develops haustoria - finger-like cell structures that form an intimate interaction with the host plasma membrane during the early stages of disease. Paul has shown that haustoria are a major site of delivery of a class of proteins called RXLR effectors, which are translocated into living plant cells where they target host proteins to suppress immunity. He was elected a Fellow of the Royal Society of Edinburgh in 2016 and won a Royal Society Wolfson Merit Award in 2018. He is a holder of a prestigious Advanced European Research Council grant.

Phytophthora infestans promotes a blue light-triggered susceptibility pathway to suppress immunity.

***Paul Birch*[1]**, *Shaista Naqvi[1], Qin He[1,2], Franziska Trusch[1], Huishan Qiu[2], Jasmine Pham[1], Qingguo Sun[2], John M Christie[3], Eleanor M Gilroy[4]*

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Blue-light (BL) phototropin receptors (phot1 and phot2) regulate plant growth by activating NPH3/RPT2-like (NRL) family members. Little is known about roles for BL and phots in regulating plant immunity. We found that *Phytophthora infestans* RXLR effector Pi02860 targets potato (St)NRL1 (Yang *et al.* 2016). StNRL1 acts as a susceptibility factor; overexpression of it enhances *P. infestans* colonisation of *Nicotiana benthamiana* and suppresses INF1-triggered cell death. Conversely, silencing StNRL1 reduces late blight disease. The ability of effector Pi02860 to suppress host immunity is dependent on its interaction with StNRL1. The effector promotes the ability of StNRL1 to facilitate proteasome-mediated degradation of the immune regulator StSWAP70 (He *et al.* 2018).

A key question arises from these observations: do BL and phots negatively regulate immunity? Whereas transient over expression of Stphot1 and Stphot2 enhances *P. infestans* colonisation of *N. benthamiana*, silencing endogenous *Nbphot1* or *Nbphot2* reduces infection, suggesting that they act as susceptibility (S) factors. Stphot1, but not Stphot2, suppressed the INF1-triggered cell death immune response in a BL- and NRL1-dependent manner. Stphot1, when co-expressed with StNRL1, promotes degradation of StSWAP70, whereas Stphot2 does not. Kinase-dead Stphot1 fails to suppress ICD, enhance *P. infestans* colonisation or promote StSWAP70 degradation. Critically, BL enhances *P. infestans* infection, which likely involves phots but not other BL receptors such as cryptochromes and F-box proteins ZTL1 and FKF1 (Naqvi *et al*. 2022). We demonstrate that Stphot1 and Stphot2 play different roles in promoting susceptibility, and Stphot1 kinase activity is required for BL- and StNRL1-mediated immune suppression. Stphot1 kinase activity is required for phosphorylation of a 14-3-3 binding site in StNRL1. 14-3-3 binding to StNRL1 is important for its ability to suppress INF1-triggered cell death and enhance pathogen infection by degrading StSWAP70.

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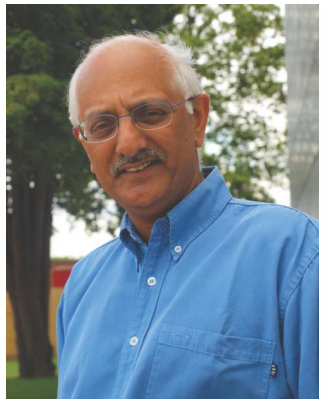
Prof Naresh Magan



Professor Magan holds the Chair in Applied Mycology at Cranfield University. He completed his BSc (Botany) and MSc (Plant Pathology) at Exeter University, U.K. and his PhD in 1982 at Rothamsted Research (external student, Reading University). He was awarded a DSc for his scientific research on "Ecophysiology of spoilage and mycotoxigenic fungi" in 2013. He has focused on food security/safety and spoilage fungi for 35+ years.

Current research includes molecular ecology and ecophysiology of spoilage/mycotoxigenic fungi in food production systems, especially the impact of climate change factors on mycotoxins in staple commodities and the development of minimisation and prevention strategies. These include physical approaches to minimising mycotoxin contamination, ecophysiology of biological control agents for improved efficacy against pests/fungal diseases and the development of novel preservation systems for food applications. He has published widely in these research areas with 350+ peer reviewed Journal papers. He has an H-index of 63 (Scopus) and 84 (Google scholar).

Climate change, mycotoxins and food safety: do we know enough?

Naresh Magan
Applied Mycology Group, Environment and AgriFood Theme, Cranfield University, Cranfield, Beds. MK43 0AL, U.K.

Staple food production is influenced by interacting abiotic and biotic factors. Under expected environmental stress in the next 10-20 years, the resilience of key food production systems and the control of fungal pathogens and mycotoxins could be significantly compromised. There may be profound impacts on the food security/safety agendas in terms of yield, nutritional quality and post-harvest losses. In the face of such environmental changes, the question arises as to whether the control strategies for pathogenic moulds and mycotoxins will have the necessary resilience. In addition, the calorific value of such contaminated staple commodities is also significantly impacted.

Fungal pathogens have evolved rapidly to develop strategies for overcoming abiotic stresses. We have focused on the impact that interacting climate change-related abiotic factors of temperature, drought stress and elevated CO_2 may have on colonisation of cereals (maize, oats), pistachio nuts and coffee by *Aspergillus*, *Fusarium* and *Penicillium* species and impacts on establishment and mycotoxin contamination. We now have evidence that colonisation of maize by mycotoxigenic fungi such as *Aspergillus flavus* is relatively unaffected by such climate-related abiotic factors while aflatoxin B_1 toxin contamination is increased. We have used RT-PCR of biosynthetic genes, RNAseq and phenotypic aflatoxin B_1 production to analyse these effects. Acclimatisation of mycotoxigenic fungi is an important area as it can provide information on whether pathogenicity and toxin production might be increased when repeatedly exposed to climate change-related abiotic factors for a number of generations. We have examined these effects in both *A. flavus* and in *Fusarium* species. Control strategies involving biocontrol of aflatoxins by using atoxigenic strains have been very successful. The question arises as to whether the strains used will be resilient under climate-related environmental conditions or whether it will be necessary to modify the screening procedures or the formulations to ensure conserved efficacy.

Our studies suggest that control may be reduced unless the atoxigenic strains used have the necessary competitiveness under climate-related abiotic stresses. Thus, control strategies may have to be changed, to take account of enhanced virulence and in some cases increased mycotoxin contamination of staple foods. Finally, in the context of climate-related abiotic stresses, the question arises as to whether existing legislation may become out of step with the problems we face in the near future.

Prof Mark Laing

Mark Laing is senior Professor and Chair of the Department of Plant Pathology, Pietermaritzburg, University of KwaZulu-Natal, South Africa as well as Director of the African Centre for Crop Improvement, University of KwaZulu-Natal. He is also a board member of Andermatt PHP (South Africa), a subsidiary of Andermatt Biocontrol AG (Switzerland), which discovers and manufactures biocontrol products for pest and disease control globally. His research areas cover applied biological control and its commercialization, plant breeding of African food and medicinal crops, and communicating on the climate crisis.

He manages a range of research projects, with 24 postgraduates at present, collaborating across multiple disciplines: Plant Pathology, Plant Breeding, Agronomy, Entomology, Animal Science and Agricultural Engineering. He has 384 publications listed in ResearchGate and supervised or co-supervised to graduation 86 PhD, 89 MSc and 135 BSc Honours students. He currently has supervision or co-supervision of 3 post-docs, 12 PhDs and 12 MSc students.

His fields of interest include

- Plant breeding: African food security crops, biofuel crops
- Biocontrol of diseases, pests and nematodes using fungi, yeasts, bacteria, viruses, nematodes;
- Postharvest disease control in fruit and vegetables using rapid hot water treatments and biocontrol agents;
- Use of silicon as a fertilizer to manage biotic and abiotic stress;
- Agricultural engineering projects to develop electricity-free heating, cooling and drying technologies for African farmers and plant breeders and
- The Climate Crisis

The Climate Crisis – It's Real, It's Here, and It's Bad

Mark Laing
Director, African Centre of Crop Improvement

The Climate Crisis is a global disaster, 200 years in the making. The cause is a combination of greenhouse gases (CO_2 and methane, in particular) that trap long-wave radiation reradiated from the earth. Life on earth for the last 20 million years has depended upon there being a stable level of around 280 ppm of CO_2. However, since the advent of the industrial revolution, these levels have climbed to 418ppm at present. Despite universal pledges in the Paris Agreement of 2015 to cut CO_2 outputs by 55%, global coal and oil use has increased. China currently builds a new coal-fired power station every two weeks and consumes 51% of global coal supplies. India derives 80% of its power from coal-fired power stations, as does South Africa. Crude oil usage globally is sitting at 16 billion litres per day. In the last 25 years, CO_2 output has increased from 55 to 110 million tons per day. The underlying driver of carbon output is the growth of the human population from 1 billion in 1800, to 7.9 billion in 2022, and a predicted 10 billion by 2056. The extra heat energy of global warming is largely absorbed by the seas, which will take 2 to 300 years to cool, even if all carbon release stopped immediately. Hence, we are on track for an increase of 30°C within the next 30 to 80 years. Furthermore, a range of positive feedback systems are already accelerating heating and may have passed critical tipping points already.

The impact is already severe in the tropics and sub-tropics, and especially in the continent of Africa. Southern Africa will be hard hit, with increasing heat and dryness in the western, central and northern regions of Southern Africa, which will become too hostile to live in over the next 15 to 20 years. In the eastern regions of SA, regular flooding can be expected, alternating with droughts, as seen in Australia over the last three years. Sea levels have risen 800mm already and will rise 3m by 2035, and 25m by 2100. Globally, 800 million to 1 billion climate refugees are expected to migrate north or south from the tropics, including 118 million migrants from Africa, by 2050. The impact on global ecosystems is already severe, and over 1 million organisms have gone extinct, reflecting the 6th cycle of mass extinctions in the earth's history. Whether humanity and its current forms of civilization can survive the next 100 years is questionable. Key determinants are whether humans can change their behaviour fast enough, i.e., in the next 8 to 15 years. Six key areas are: (1) the replacement of all fossil fuels with renewable energy; (2) a drastic reduction in the output of climate pollutants, especially CO_2 and methane, >60%; (3) restoration of ecosystems on land and at sea; (4) a drastic reduction in meat consumption and a transformation of global agriculture to reduce its carbon footprint (32% of current outputs); (5) changing the global economic model of constant growth of GDP, which assumes infinite resources on earth, to sustainable human wellbeing in a circular economy; (6) and controlling human population growth.

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52nd Congress of the
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FINAL PROGRAMME

Sunday 31 July 2022

15h00-18h00	Registration at Future Africa
18h30-22h30	Optional dinner at FABI, University of Pretoria
	Introduction of Nature Africa Special Issue

Monday 1 August 2022

07h00-08h00	Registration at Future Africa

Session 1: Opening and JE Vanderplank Memorial address — Prof Noëlani van den Berg

08h00-08h10	Welcome: Prof Bernard Slippers
08h10-08h30	Opening address: **Prof Barend Erasmus**
08h30-09h15	**JE Vanderplank Memorial Address: Prof Sophien Kamoun**
	Reflections of a restless plant pathologist

Session 2: Genomics — Dr Andi Wilson

09h20-09h50	**K1: Prof Eva Stukenbrock**
	Microbial interactions and co-evolution in the plant phyllosphere
09h50-10h05	**Dr Janneke Aylward**
	Genomic features associated with leaf and stem pathogenicity in *Teratosphaeria*
10h05-10h20	**Bianca Hough**
	Detection of novel mycovirus diversity in *Ceratocystis fimbriata*
10h20-10h35	**Deborah Louisa Narh Mensah**
	NRPS-dependent siderophore synthetase gene clusters and characteristics of NRPS siderophore synthetase genes in *Armillaria* and other species in the *Physalacriaceae*

Session 2: Genomics — Dr Andi Wilson

10h35-10h50	**Nomakula Zim**
	The molecular changes that may have contributed to the adaptation of *Xanthomonas vasicola* pv. *vasculorum* to *Eucalyptus grandis*.
10h50-11h00	Sponsorship Presentation: Inqaba Biotech

11h00-11h30 Tea/Coffee & Poster Viewing

Session 3: Genomics (Continues) — Dr Janneke Aylward

11h30-11h45	**Prof Brenda Wingfield**
	Molecular basis of cycloheximide tolerance in the Ophiostomatales: A genome "needle in haystack" discovery
11h45-12h00	**Dr Beatrix Coetzee**
	Discerning the global phylogeographic distribution of *Hyllosticta citricarpa* by means of whole genome sequencing
12h00-12h15	**Dr David Read**
	Novel viral diversity associated with *Helianthus annuus* L. in Gauteng and Free State
12h15-12h30	**Benedicta Swalarsk-Parry**
	Genome Wide Association approach to identify genes linked to growth in *Fusarium circinatum*.
12h30-12h45	**Carlynn Jacobs**
	Identification of genes and gene clusters involved in the biosynthesis of mycotoxins produced by *Fusarium* species associated with maize in South Africa

13h00-14h00 Lunch

Monday 1 August 2022

Session 4: Molecular Biology — Dr Markus Wilken

14h00-14h30	**K2: Prof Almuth Hammerbacher**
	Auxin as a virulence factor in fungi causing Ceratocystis wilt in woody hosts
14h30-14h45	**Dr Andi Wilson**
	Disruption of a secondary mating-type gene de-regulates sex-associated pathways in *Huntiella omanensis*
14h45-15h00	**Prof Adane Abraham**
	Molecular diversity of maize RNA and DNA viruses in Ethiopia: Implication for Africa
15h00-15h15	**Prof Irene Barnes**
	Ceratocystis wilt in South Africa: An increasing threat to forestry and agriculture
15h15-15h30	**Dr Hazal Kandemir**
	ARISE: An Infrastructure for Dutch biodiversity - A fungal contribution

15h30-16h00 Tea/Coffee & Poster Viewing

Monday 1 August 2022

Session 5: Molecular Biology (Continues) — Dr Mariska Lilly

16h00-16h15	**Dr Cheusi Mutawila, Bayer** Plant Pathology in the era of modern breeding.
16h15-16h30	**Dr Jan Nagel** *Neofusicoccum parvum:* A global threat to plant health
16h30-16h45	**Dr Minette Havenga** Genetic diversity of esca and Petri disease pathogen, *Phaeoacremonium minimum*, in six vineyards and two nursery mother blocks in the Western Cape
16h45-17h00	**Prof Pedro Crous** A phylogenomic approach to elucidate lifestyles in *Dothideomycetes*
17h00-17h15	**Dr Duong Vu** Improved identification of fungi using high-throughput DNA barcode data from a curated culture collection
17h15-17h30	**Dr Marileide Moreira Costa** Defining species in *Fusarium* and the FUSARIOID-ID database
17h30-17h45	**Dirk Aldrich** From mutants to informants: Using infectious clones to study citrus tristeza virus-induced stem pitting
17h45-18h00	**Deanne du Plessis** Evidence that a horizontally acquired laccase gene confers pathogenicity in the conifer pathogen, *Leptographium wageneri*
18h00-18h15	**Nam Pham** Eucalyptus scab and shoot malformation: A threat to commercial orestry

19h00-22h30 — **Welcome Function at Javett, UP Campus**

Tuesday 2 August 2022

07h15-08h00	**Nature Africa Panel Discussion**

Session 6: Ethyl M. Doidge Memorial Address — Dr David Read

08h00-08h45	**Ethyl M. Doidge Memorial Address: Prof Anne Pringle** **Rethinking Baker's articulation of an "ideal weed" with fungi: What is the "ideal invasive"?**

Tuesday 2 August 2022

Session 7: Host-Pathogen/Insect Interactions — Dr Lisa Ann Rothman

08h45-09h15	**K3: Dr Petra Boevink** **Entering via the front door: cytoplasmic effectors taken into host cells via endocytosis**
09h15-09h30	**Dr Thabiso Motaung** Extracellular vesicles provide a window into the pathobiology of economically important South African fungal pathogens.
09h30-09h45	**Alison Brigden** The intergenic region is a pathogenicity determinant of Tomato curly stunt virus in *Nicotiana benthamiana*
09h45-10h00	**Myriam Solís** Two *Eucalyptus* pathogens, with different levels of aggressiveness, have similar infection biology
10h00-10h15	**Celiwe Nxumalo** Functional characterization of *Phytophthora parasitica* PpRxLR1 and PpRxLR6 effector proteins in *Nicotiana benthamiana*
10h15-10h30	**Prof Martin Coetzee** *Botryosphaeriaceae* associated with the native tree species *Berchemia discolor* in agricultural and natural ecosystems in the Limpopo Province.
10h30-10h40	Sponsorship presentation: Labotec

10h40-11h00 — **Tea/Coffee & Poster Viewing**

Session 8: Host-Pathogen/Insect Interactions — Dr Wilma Nel

11h00-11h15	**Mamokete Bokhale** Deciphering the role of the SlyA transcriptional regulator in cell metabolism of *Pectobacterium brasiliense* 1692 using LC-MS-MS based Molecular Networking.
11h15-11h30	**Dr Jane Chepsergon** "Short but Crucial": Role of Short Linear Motifs (SLiMs) in *Phytophtora parasitica* "Core" PpRxLR1 Effector
11h30-11h45	**Dr David Nsibo** Population genetic diversity and structure of *Exserohilum turcicum* from smallholder and emerging commercial maize farms in the Eastern Cape province of South Africa
11h45-12h00	**Alexander Zwolinski** Investigating the role of Tomato curly stunt virus V2 coding region on pathogenicity *in vivo* using site-directed mutagenesis.

Tuesday 2 August 2022

Session 8: Host-Pathogen/Insect Interactions — Dr Wilma Nel

12h15-12h30	**Inge Block** Postharvest mould of pome fruit stems and calyx sepals- an investigation into the incidence, cause and management.
12h30-12h45	**Dr Ariska van der Nest** Population structure and diversity of *Dothistroma septosporum* in Spain suggests several pathogen introductions
12h45-13h00	**Kayla Alexis Midgley** *Phytophthora cinnamomi* CRN effectors and their roles in manipulating cell death to maintain their hemi-biotrophic lifestyle

13h00-14h00 Lunch

Session 9: Host-Pathogen/Insect Interactions — Dr David Nsibo

14h00-14h30	**K4: Prof Paul Birch** **A *Phytophthora* effector targets a blue light-triggered signalling pathway to suppress immunity.**
14h30-14h45	**Alicia Fick** A susceptible avocado rootstock is confused about the importance of NLR proteins during *Phytophthora cinnamomi* infection
14h45-15h00	**Kevin Scheepers** Effect of elevated CO_2 on maize susceptibility to grey leaf spot (GLS) disease

Hans Merensky Chair in Avocado Research

15h00-15h30 Tea/Coffee & Poster Viewing

Session 10: Applied Pathology — Dr Khumbuzile Bophela

15h30-15h45	**Dr Beauty E Omoruyi** Biocontrol of *Fusarium* species utilising indigenous rooibos and honeybush aqueous extracts
15h45-16h00	**Jenny Crause** Fungal diversity and mycotoxin contamination of wheat grain produced under different crop rotation systems and tillage practices in the Western Cape
16h00-16h15	**Dr Tanay Bose** Does the severity of Phytophthora root-rot vary between genotypes of *Eucalyptus nitens*?
16h15-16h30	**Dr Tarekegn Terefe** The continual emergence of new *Puccinia triticina* races on wheat in South Africa

Tuesday 2 August 2022

Session 10: Applied Pathology — Dr Khumbuzile Bophela

16h30-16h45	**Dr Elsie Cruywagen** Sensitivity of *Alternaria* species from potato in South Africa to different fungicides
16h45-17h00	**Conrad Achilonu** First report of black spot disease and seedling wilt of pecans (*Carya illinoinensis*) caused by *Alternaria alternata* in South Africa
17h00-17h15	**Dr Gideon van Zyl** Fungicide deposition on wheat leaves as influenced by seeding density, spray volume and tractor forward speed
17h15-17h30	**Dr Ida Wilson** The dream of boosting African crop productivity vs the reality of crop loss to pathogens
17h30-17h45	**Dr Lisa Rothman** Assessment of *Sclerotinia sclerotiorum* sclerotia recovered from soybean and sunflower silos across South African production regions
17h45-18h00	**Dr Lisa Rothman** Bibliographical analysis of *Sclerotinia sclerotiorum* disease management on oilseed crops.
18h00-18h15	**Dee Twiddy** Understanding fungal nut diseases of Macadamia fruit in South Africa

18h30-20h30 Dinner and Starke Ayres Quiz Evening at Future Africa

20h30-21h00 Milden Hall Stakes

Wednesday 3 August 2022

Session 11: Applied Pathology (Continues) — Dr Minette Havenga

08h00-08h15	**Prof Jacquie van der Waals** IPM: The only option for managing *Spongospora subterranea* f. sp. *subterranea* on potatoes
08h15-08h30	**Dr Alan Wood** The heteroecious life cycle of *Puccinia digitariae* on *Digitaria eriantha* and *Solanum* species, the first to be elucidated in South Africa in a century.
08h30-08h45	**Prof Cobus Visagie** Exploring the diversity of mycotoxigenic fungi in South African food and feed
08h45-09h00	**Prof Hans Maree** Validation of high-throughput sequencing for routine plant virus diagnostics
09h00-09h15	**Prof Willem Boshoff** Rust diseases of food and forage crops in South Africa: new threats and research to mitigate their impact

Wednesday 3 August 2022

Session 11: Applied Pathology (Continues) — Dr Minette Havenga

09h15-09h30	**Prof Bernard Slippers** The Plant Disease Pyramid: Reflecting on a century of plant pathology development
09h30-09h45	**Ayesha Shaikh** Timing of infection drives fungal growth and fumonisin production by *Fusarium verticillioides* in maize grain
09h45-10h00	**Wilku Meyer** Identification of new *Puccinia helianthi* race variants in South Africa and their impact on sunflower hybrids
10h00-10h30	**Tea/Coffee & Poster Viewing**

Session 12: Climate Change and Digital Technology in Plant Pathology — Dr Kwasi Yobo

10h30-11h00	**K5: Prof Naresh Magan** **Climate change, mycotoxins and food safety: do we know enough?**
11h00-11h15	**Kira Lynn** Real-time PCR high-resolution melting curve analysis to detect *Ceratocystis* species in the Latin American clade
11h15-11h30	**Hendrik Johannes Esterhuizen** A non-destructive technique for early detection of Phytophthora root rot using hyperspectral leaf reflectance
11h30-12h00	**K6: Prof Mark Laing** **The Climate Crisis – It's Real, It's Here, and It's Bad**

Session 13: Applied Pathology — Dr Lindani Moyo

12h00-12h15	**Stephan Theron** Influence of crop rotation and different tillage practices on Fusarium crown rot and agronomical performance of wheat in the Western Cape.
12h15-12h30	**Darryl Herron** A standardised assay to assess risks of *Fusarium circinatum* (pine pitch canker) infection
12h30-12h45	**Vernon Jacobs** Assessment of dieback pathogens of apple trees to be removed and the detection of *Diplodia seriata* on chipped apple wood
12h45-13h00	**Prof Botma Visser** Back to the future: using herbarium specimens to reconstruct the genetic development of two wheat rusts in South Africa
13h00-14h00	**Lunch**

Wednesday 3 August 2022

Session 14: Applied Pathology (Continues) — Dr Sylvans Ochola

14h00-14h15	**Dr Rene Sutherland** Resistance of *Ralstonia* biofilms to disinfectants
14h15-14h30	**Nicola Theron** Members of the genus *Cladosporium cladosporioides* and its role in pecan scab in South Africa
14h30-14h45	**Felipe Balocchi** *Pewenomyces kutranfy*, causal agent of an important canker disease on *Araucaria araucana* in Chile
14h45-15h00	**Dr Cornel Bender** Fig rust: an unexplored disease in South Africa
15h00-15h15	**Sinegugu Precious Nothando Shude** An integrated control strategy for managing Fusarium head blight of wheat using epiphytic yeasts and a plant defence inducer
15h15-15h30	**Fagrie Arnold** Impact of crop rotation and tillage practices on the incidence of Fusarium crown rot of wheat in the Western Cape
15h30-15h40	Sponsorship Presentation: Zeiss
15h40-16h10	**Tea/Coffee & Poster Viewing**

Session 15: Applied Pathology (Continues) — Dr Tanay Bose

16h10-16h25	**Dr Neriman Yilmaz Visagie** Facial Eczema: An important yet poorly understood disease of dairy cattle in South Africa
16h25-16h40	**Thabo Phasoana** Evaluation of fungicide seed treatments for control of *Pythium* and *Rhizoctonia* on soybean under glasshouse conditions
16h40-16h55	**Dr Julia Meitz-Hopkins** Plum decay control using gum arabic edible coating with salicylic acid or thymol
16h55-17h10	**Annah Mahlangu** The influence of storage practices and facilities on seed quality of on-farm saved soybean seeds produced by smallholder farmers in the Lesedi Local Municipality, Gauteng
17h10-17h25	**Dr Trudy Paap** Invasion frameworks: a forest pathogen perspective
17h25-18h40	**SASPP AGM**
19h15	**Gala Dinner and Awards at The Function Hall, UP Conference Centre**

Presenting Author	CID	Title
1 Molecular Biology		
Alishia van Heerden	MB1	Development of a LAMP assay for on-site diagnosis of the novel *Eucalyptus* pathogen, *Elsinoë necatrix* using the elsinochrome toxin cluster as a marker
Frances Lane	MB2	The MAT1-1-2 gene in *Ceratocystis albifundus* plays a role in gene deletion during unidirectional mating-type switching
Nam Pham	MB3	*Calonectria* species associated with *Eucalyptus* plantation soils in Colombia
WenWen Li	MB4	*Calonectria* species isolated from diseased leaves and soils in *Eucalyptus* plantations in the GuangDong province of southern China
Seamus Morgan	MB5	Grapevine infecting viroid diversity in South Africa
Willem Boshoff	MB6	Pathogenicity and microsatellite characterization of *Puccinia hordei* in South Africa
Nicole van Vuuren	MB7	Fungal diversity in Namibian *Stipagrostis* 'fairy circles' including descriptions of four new *Curvularia* species
Callin Ceriani	MB8	Population genetic analysis of the pitch canker pathogen *Fusarium circinatum* suggests a limited introduction into Colombia with little subsequent change
Nokulunga Mzimela	MB9	Molecular detection of *Ramularia collo-cygni* and *Pyrenophora teres* from barley in South Africa
Jan Nagel	MB10	Diversity and structure of secreted LysM domain-containing peptides in the *Botryosphaeriaceae*
Sikelela Buthelezi	MB11	Characterization of the mating-type locus and associated genes from five *Sclerotinia* species
Janneke Aylward	MB12	A comparison of the population structure of *Teratosphaeria pseudoeucalypti* from *Eucalyptus* plantations in Australia and Uruguay
Nombuso Hadebe	MB13	Soilborne *Fusarium* and *Phytophthora* species diversity on avocado and macadamia in South Africa
Fanele Cabangile Mnguni	MB14	Identification and pathogenicity of *Rahnella* species isolated from diseased onion bulbs from the United States of America and South Africa

POSTERS

Presenting Author	CID	Title
1 Molecular Biology		
Alida van Dijk	MB15	A CRISPR-Cas9 mediated gene knockout system o functionally characterize virulence genes in *usarium circinatum*
Mariette Truter	MB16	Characterisation of the *Fusarium oxysporum* species complex associated with sweet potato in South Africa
Kayleigh Bougard	MB17	Characterisation of the association of apple stem pitting virus with pear stony pit disease
Monique Muller	MB18	Population studies indicate multiple introductory events of *D. pini* into France
Lin Zhao	MB19	Revisiting *Clonostachys*
Katelyn Baird	MB20	Identification of putative NLP effectors in *Phytophthora cinnamomi* and determination of their expression profiles in *Persea americana*
2 Genomics		
Tendekai Mahlanza	G1	Transcriptomic responses to the banana bunchy top virus in banana
Boitshoko Rammuki	G2	RNA interference-related genes in *Ascomycota*
Alandie Nieuwoudt	G3	Whole genome sequencing of *Exserohilum turcicum* races present in maize growing fields of South Africa
Dawit Kidanemariam	G4	Gene editing to understand RNAi pathways in the maize pathogen *Cercospora zeina*
Vinolia N. Danki	G5	QTL identification of *Ceratocystis albifundus* genomic regions associated with laccase activity using GWAS
Teresa Coutinho	G6	Bacterial and viral inhabitants of storage onion bulbs in the USA
Kyle Leeuwendaal	G7	Improving specificity and throughput of diagnostic PCRs aimed at maize pathogen detection
Chanel Thomas	G8	Detection of mating allele diversity in South African populations of the multi-host pathogen, *Sclerotinia sclerotiorum*
Benedicta S. Swalarsk-Parry	G9	Identification and characterization of a growth QTL f *Fusarium circinatum* on pine-based medium

POSTERS

Presenting Author	CID	Title
2 Genomics		
Jostina Rakoma	G10	The mating-type locus in Ambrosial fungi from the *Ceratocystidaceae*
Minette Havenga	G11	Pathogenicity-related gene expression in the aggressive *Eucalyptus* foliar pathogen, *Teratosphaeria destructans*, under nitrogen starvation
David Read	G12	Filling in the gaps: expanding our knowledge of the South African plant virome
Preston L. Shaw	G13	The latent pine pathogen *Diplodia sapinea* contains two dispensable chromosomes with distinct genomic characteristics
Anien Viljoen	G14	Comparative genomics of the mitochondrial genomes of fungal species in the *Ceratocystidaceae*
Irene Barnes	G15	Evaluation of pines important to South Africa forestry for susceptibility to *Dothistroma septosporum* in a Colombian sentinel planting
Sicelo Masuku	G16	Variation in azole resistance within South African population of *Fusarium circinatum*
3 Applied Pathology		
Myriam Solís	AP1	*Colletotrichum theobromicola* causes a shoot and leaf disease on *Eucalyptus* in South Africa
Myriam Solís	AP2	Development of a protocol to screen *Eucalyptus* genotypes for resistance to the aggressive foliar pathogen *Teratosphaeria destructans*
Alinaswe Selebi	AP3	A new mating-type gene discovered in the chestnut blight pathogen *Cryphonectria parasitica*
Sara Monteiro	AP4	Grey mould control of strawberries using orange oil
Khumbuzile Bophela	AP5	Survey of potato soft rot- and blackleg-causing bacteria in South Africa
Elsie Cruywagen	AP6	*Alternaria* species causing leaf spot on potato in South Africa
Idah Ntuli	AP7	Survey of *Alternaria alternata* populations from different crops in Mpumalanga, Gauteng and Limpopo Provinces in South Africa

Presenting Author	CID	Title
3 Applied Pathology		
Julia Meitz-Hopkins	AP8	Postharvest application of SO_2 volatiles on tomato to prevent Alternaria rot
Khumbuzile Bophela	AP9	Potential sources of P*hytophthora* spp. infestation in South African citrus nurseries
Gert Marais	AP10	*Neofusicoccum parvum* and other members of the *Botryosphaeriaceae* associated with dieback in pecans in South Africa
Gert Marais	AP11	*Eva luation* of fungi for dry retting of kenaf
Cheyenne A. Theron	AP12	*Lophodermium* species diversity and distribution on commercial *Pinus* spp. across the Southern Hemisphere
Raven Wienk	AP13	Quantifying susceptibility to *Fusarium euwallaceae* in popular avocado cultivars
Claudette Dewing (Dr Yilmaz)	AP14	Three new *Fusarium* species isolated from Eastern Cape dairy farm pastures
Adri Grobler	AP15	Isolation and characterisation of phages for potential biocontrol of *Pantoea ananatis* and *P. agglomerans*
Shivan Bezuidenhout	AP16	The fungal diversity and mycotoxins associated with South African stored soybeans
Rochelle Beets	AP17	Carry-over effect of the long-term application of organic amendments on apple replant disease
Nombulelo Qikani	AP18	Biodiversity of fungi on maize agricultural soils in the Free state and North west
Tumisang Mokgobu	AP19	Pathogenicity of diverse African isolates of *Cercospora zeina* on maize
Felipe Balocchi	AP20	Three new species of *Pewenomyces* (*Coryneliaceae*) from *Araucaria araucana* in Chile
Jenna-Lee Price	AP21	Fungi and their mycotoxins associated with maize ear rots from emerging farms in the Eastern Cape, South Africa
Angel Maduke	AP22	Diversity of the *Botryosphaeriaceae* on Macadamia leaves, nuts, and racemes and their association with disease
Francois Viljoen	AP23	Mycoflora and mycotoxins associated with cowpea seeds in South Africa

Presenting Author	CID	Title
3 Applied Pathology		
Sherly Mabena	AP24	Characterization of potential plant growth promoting rhizobacteria isolated from sweet potatoes (*Ipomoea batatas* (L.) Lam) in South Africa
Gerhard Botha	AP25	Characterisation of Flower Blight Causal Agents in South African Macadamia Orchards
Isabella du Toit	AP26	Fungicide sensitivity among South African *Puccinia graminis* f. sp. *tritici* isolates
Makemelo Tsotetsi	AP27	Functional analysis of the AvrSr50 avirulence gene in South African *Puccinia graminis* f. sp. *tritici* isolates
Fagrie Arnold	AP28	Population genetic analysis of *Fusarium pseudograminearum* associated with Fusarium crown rot and Fusarium head blight of wheat in different production regions of the Western Cape
Alec Edwards	AP29	Characterising plant health promoting microorganisms (PGPM's) and potential biological control agents (BCA's) from the soybean microbiome
Alice Mthembu	AP30	Survey of Fungal and *Oomycete* diversity from maize field soils in the Eastern Cape
Louise Smit	AP31	Hypovirulence associated with Diaporthe stem canker pathogens for biocontrol
Neo Victor Hlongwane	AP32	Exploring soybean and sunflower microbiomes for beneficial bacterial microorganisms.
Lindani Moyo	AP33	Organic amendments transformed the apple (*Malus domestica* L.) rhizosphere fungal, but not bacterial, community in an orchard replant soil
Justin Clayton	AP34	Exploring the cannabis (*Cannabis sativa*) microbiome for beneficial microorganisms
Sharon McFarlane	AP35	And then there were three: A new rust incursion in the South African sugar industry
Leoka Phillip Mphuthi	AP36	Detection and assessing Potato Virus Y strains infecting tobacco (*Nicotiana tabacum*) in South Africa
Thamsanqa Msweli	AP37	The effect of phosphite treatment against *Phytophthora cinnamomi* on *Leucadendron argenteum* (L.) R.Br.

POSTERS

Presenting Author	CID	Title
3 Applied Pathology		
Habofanoe Fosa	AP38	Isolation and identification of three *Bacillus* spp. causing soft rot of spineless cactus pear
Habofanoe Fosa	AP39	Biocontrol of Rhizopus rot on spineless cactus pear (*Opuntia ficus-indica* L.)
Habofanoe Fosa	AP40	Root growth promotion of spineless cactus pear cladodes using *Debaryomyces fabryi* and *Aureobasidum pullulans*
Thabiso Masisi	AP41	Identification and occurrences of Fungi and Micotoxin contamination in sorghum grain fractions
Jesse Hartley, Tsakani Miyambo	AP42	The Distribution of White Root Rot caused by *Rosellinia necatrix* in South Africa
Dolly Tuaandi	AP43	First report of post-harvest decay caused by *Penicillium, Botrytis and Rhizopus* spp., in Cape Gooseberry (*Physalis peruviana*) in the Western Cape, South Africa
Onalo Zungu	AP44	An overview of oat diseases in the Western Cape, South Africa
Mahlane Godfrey Kgatle	AP45	Surveying maize foliar diseases in the Eastern Cape.
Renaan Thompson	AP46	Seed-borne fungi associated with *Pinus* seeds in South Africa: Effect on seed germination and pathogenicity studies
Conrad Achilonu	AP47	*In vitro* fungicide evaluation and antifungal activities of pecan leaf and husk extracts against *Alternaria alternata*: HPLC analysis of phenolic compounds
Conrad Achilonu	AP48	Random amplified microsatellites (RAMS) analysis showed no link to geographical location of *Alternaria alternata* populations causing black pot of pecans (*Carya illinoinensis*) in South Africa
Gloria Mandiriza	AP49	Zorvec Encantia®, a new tool to manage late blight in potatoes
Alaba Olaitan Adeji	AP50	Evaluation of *Mangifera indica, Azadiratha indica* and *Hyptis suaveolens* for the Management of Seedling Blight pathogen, *Lasiodiplodia theobromae* of Cashew (*Anacardium occidentale*)
Khanyisile Botshelo	AP51	The antagonist potential of *Trichoderma* spp. against he White root rot pathogen *Rosellinia necatrix*

POSTERS

Presenting Author	CID	Title
4 Climate Change		
Mariska Lilly	CC1	Investigations into *Fusarium verticillioides*-maize interactions related to fumonisin production under drought stress conditions – an omics approach
5 Host- pathogen/ insect interactions		
Miché Kotze	HP1	Emerging postharvest diseases on Forelle pears in the Western Cape
Shawn Fell	HP2	Previously unknown gall symptoms associated with *Uromycladium acaciae* infection on *Acacia mearnsii*
Chizne Peremore	HP3	Extracellular Vesicles of a maize fungal pathogen *Fusarium verticillioides*
Melissa Joubert	HP4	Unravelling infection by *Avocado Sunblotch Viroid*
Thembeka Majola	HP5	Optimizing Rapid Hot Water Treatments and Biocontrol Yeast Antagonists for Suppressing Postharvest Avocado Anthracnose and Stem-end rot Diseases
Francinah Ratsoma	HP6	Extracellular vesicle secretion and biofilm formation of the filamentous phytopathogen *Fusarium circinatum*
Lenteli van Zyl	HP7	Production of defensive metabolites by *Pinus patula* X *Pinus tecunumanii* hybrids in response to *Fusarium circinatum* infection
Martin-John Richard	HP8	*Diplodia seriata* main causal organism for black rot on 'Forelle' pears in the Western Cape
Jan Nagel	HP9	*Botryosphaeria dothidea* strategies to establish asymptomatic infections
Jane Ramaswe	HP10	Involvement of the Ste2 pheromone receptor in chemotropic sensing of signals from pine root exudates
Taryn Armfield	HP11	Fungal diversity of marama bean seeds, leaves and tubers from South Africa
Alec Edwards	HP12	Characterising the effect of salicylic acid on Sclerotinia stem rot of soybean

Presenting Author	CID	Title
5 Host- pathogen/ insect interactions		
Londeka Mkhize	HP13	Biocontrol of Postharvest Pathogens Infecting Avocado Using Endophytic *Trichoderma* spp.
Teresia Macharia	HP14	Functional analysis of a Root-Knot Nematode, *Meloidogyne javanica* effector protein
Trystan Nadasen	HP15	Functional screening the *Cercospora zeina* Sn1 candidate effector in *Nicotiana benthamiana*
Claire Randolph	HP16	A population genetics study of *Fusarium euwallaceae* in South Africa, the pathogenic fungal symbiont of the polyphagous shot hole borer
Phrasia Mapfumo	HP17	Planting date and environmental effects on Sclerotinia head rot progression in sunflower
Ndivhuwo Ramatsitsi	HP18	Response of five potato cultivars to *Meloidogyne enterolobii* and *Meloidogyne javanica* infections
Jenny Crause	HP19	Multi-environment efficacy of fungicides against Fusarium head blight of wheat and mycotoxin contamination
Casey Gill	HP20	Pacbio sequencing to elucidate fungal mutualists associated with *Xylosandrus crassisculus*, an ambrosia beetle commonly found in avocado orchards in South Africa
Ruby May Ebbeling	HP21	Precision Phenotyping of *Pinus* for Resistance against *Fusarium circinatum*
Ahmed Idris Hassen	HP22	Biocontrol Mechanisms of *Rhizobacteria* against *usarium* spp. Associated with Root Rot in Maize (*Zea mays* L.)
6 Digital Technology in Plant Pathology		
Valencia Mogashoa	DT1	Predicting resistance of *Eucalyptus* hybrid clones to *C. austroafricana* using FT-IR