Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

SAGWRI

South African Grape and Wine
Research Institute

POSTGRADUATE INFORMATION SESSION

Prof Melané Vivier
Director

Programme:

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Introduction to SAGWRI

- The unique opportunities linked to post-graduate study at SAGWRI
- Frequently Asked Questions
- Open Discussion

Faculty of AgriSciences

Stellenbosch UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

AGRICULTURAL ECONOMICS

AGRONOMY

ANIMAL SCIENCE

CONSERVATION ECOLOGY AND ENTOMOLOGY

FOOD SCIENCE

FOREST AND WOOD SCIENCE

GENETICS

HORTICULTURAL SCIENCE

PLANT PATHOLOGY

SOIL SCIENCE

VITICULTURE AND OENOLOGY

SOUTH AFRICAN GRAPE AND WINE RESEARCH INSTITUTE (SAGWRI)

Who we are

SAGWRI is a Research and PG Training Institute:

- Has a broad scope and mandate
- Operates inter-facultatively within SU
- SAGWRI focuses on Integrated Grape and Wine Sciences and Biotechnology
- Also coordinates the PG program of the Department of Viticulture and Oenology

The South African Wine industry was 365 YEARS old on 2 February 2024

Training and Research in Grape and Wine Sciences at SU is 106 years old in 2024 and unique in RSA

RSA Industry statistics

- 8th largest wine producer in the world
- 15th in the world in terms of vineyards planted
- 6th largest exporter of wine in the world

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

What we are looking for:

- Highly motivated and curious students interested in pursuing post-graduate studies in a multi-disciplinary research environment

We offer *Opportunities*:

- Post-graduate training and research opportunities to students with a diversity in academic backgrounds
- Opportunities to engage with real-life (industry) problems and translate it to science questions and solutions (applied and fundamental)

Degree programmes offered

Opportunities for postgrad studies:

MSc and PhD in Viticulture;

MSc and PhD in Oenology

Hons, MSc and PhD in Grape and Wine Biotechnology

MSc and PhD in Generic AgriSciences

Viticulture/Oenology	Grape&Wine Sciences/ Biotechnology
PhD	PhD
MScAgric	MSc
BScAgric	HonsBSc
Viti/Oeni/Agri programmes	BSc/BEng…..

FAQs:

1. Can I join without Viti/Oeni background?

2. Can I rejoin another department after a Hons, or MSc at SAGWRI?

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

Horticulture/
Plant Pathology/
Soil Science
Food Science/
etc

RESEARCH AND TRAINING @SAGWRI

Engineering

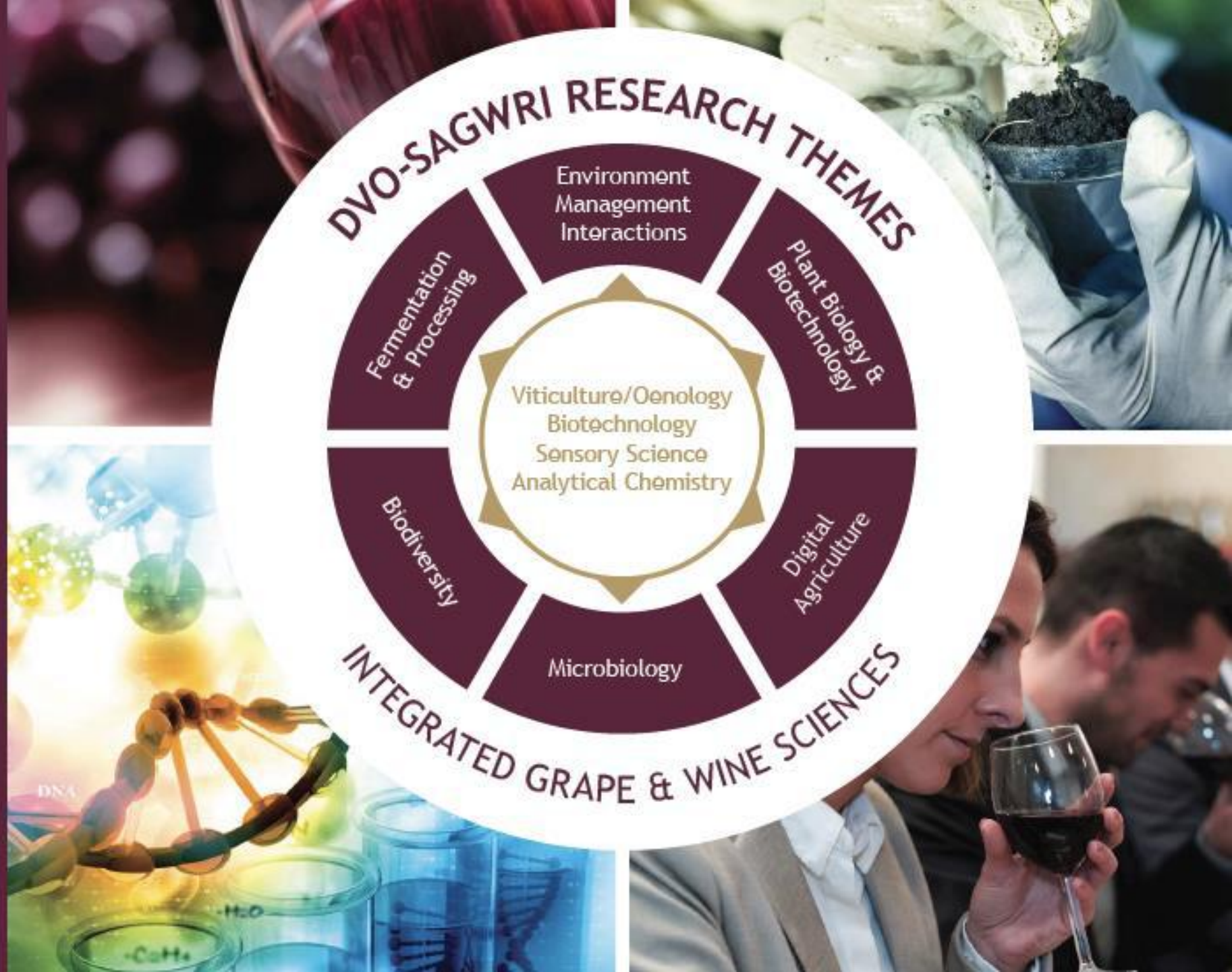
Microbiology/
Genetics/
Biotechnology/
Biochemistry/
Chemistry/
etc

Applied Maths/
Data Science/
Bioinformatics/
etc

Viticulture
and Oenology

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe





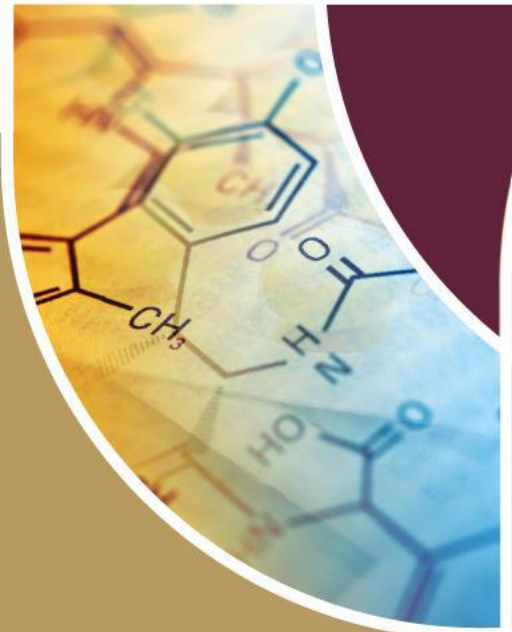


- 7 Research laboratories
- Tissue culture and greenhouse facilities

Research & Training Vineyards

Research &Training Cellar

Sensory Facility



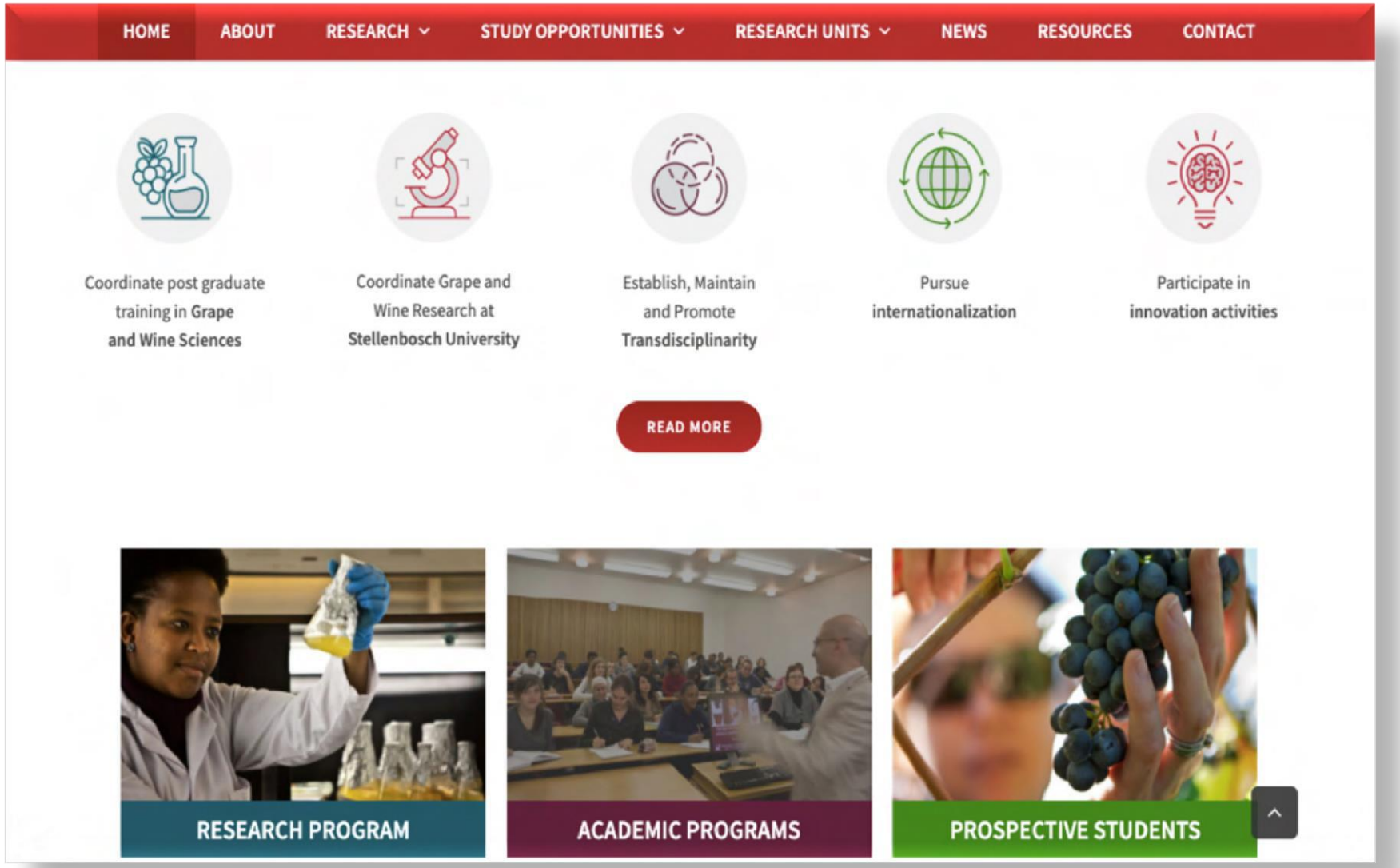
Chemical Analytical Lab

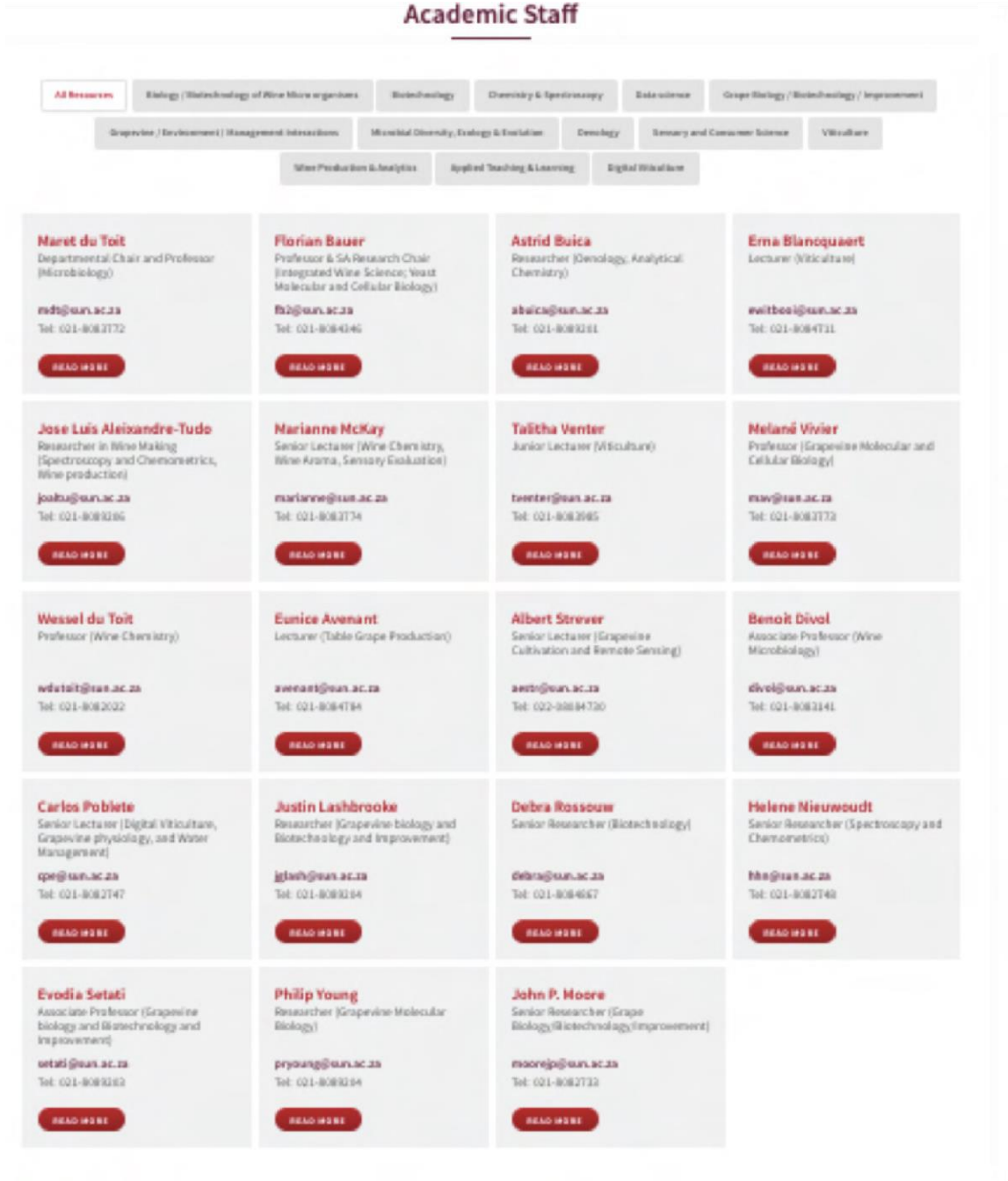
FAQs: Research

Where can I get more info on the programmes, the academics and possible projects?

Please use the website (sagwri.sun.ac.za)

Use the website (sagwri.sun.ac.za).....





Visit SAGWRI website for more info

Identify themes of interest and contact academics to discuss project options

All applications are subject to the availability of research funds and laboratory space.

Researchers

TALITHA VENTER

RESEARCH AND TEACHING FOCUS

As a young academic I am still in the process of establishing a concrete research path. At present my focus is in the areas of digital viticulture and grapevine x environment x management interactions. A very important focus is my teaching – an aspect I have a great passion for. In addition to the theoretical lectures which I present in a variety of topics related to the cultivation and management of grapevines, I also drive the practical training of students and strive to give them as much exposure to these training activities as possible. I am excited about the re-establishment of the training and research vineyards at Welgevallen Farm (a process I have been, and will continue to, be very involved in) and especially the opportunity to use them for training our students in future. (link to one or more of the "areas" = viticulture,)

BIOGRAPHY

Coming from Port Elizbeth in the Eastern Cape (where citrus rather than grapes are produced) it may seem unlikely to end up in the field of viticulture. I, however, did! After matriculating from Collegiate Girls' High School in 2005, I enrolled for a BSc(Agric) in Viticulture and Oenology degree at Stellenbosch University, completing the degree in 2009. Thereafter I entered the industry as a viticulturist resuming my studies At Stellenbosch University a few years later and obtaining my MSc(Agric) in Viticulture in 2015. From there I returned to industry once again returning to Stellenbosch University as a Junior lecturer in Viticulture in January 2019.

Hometown: Port Elizabeth, Eastern Cape, South Afica

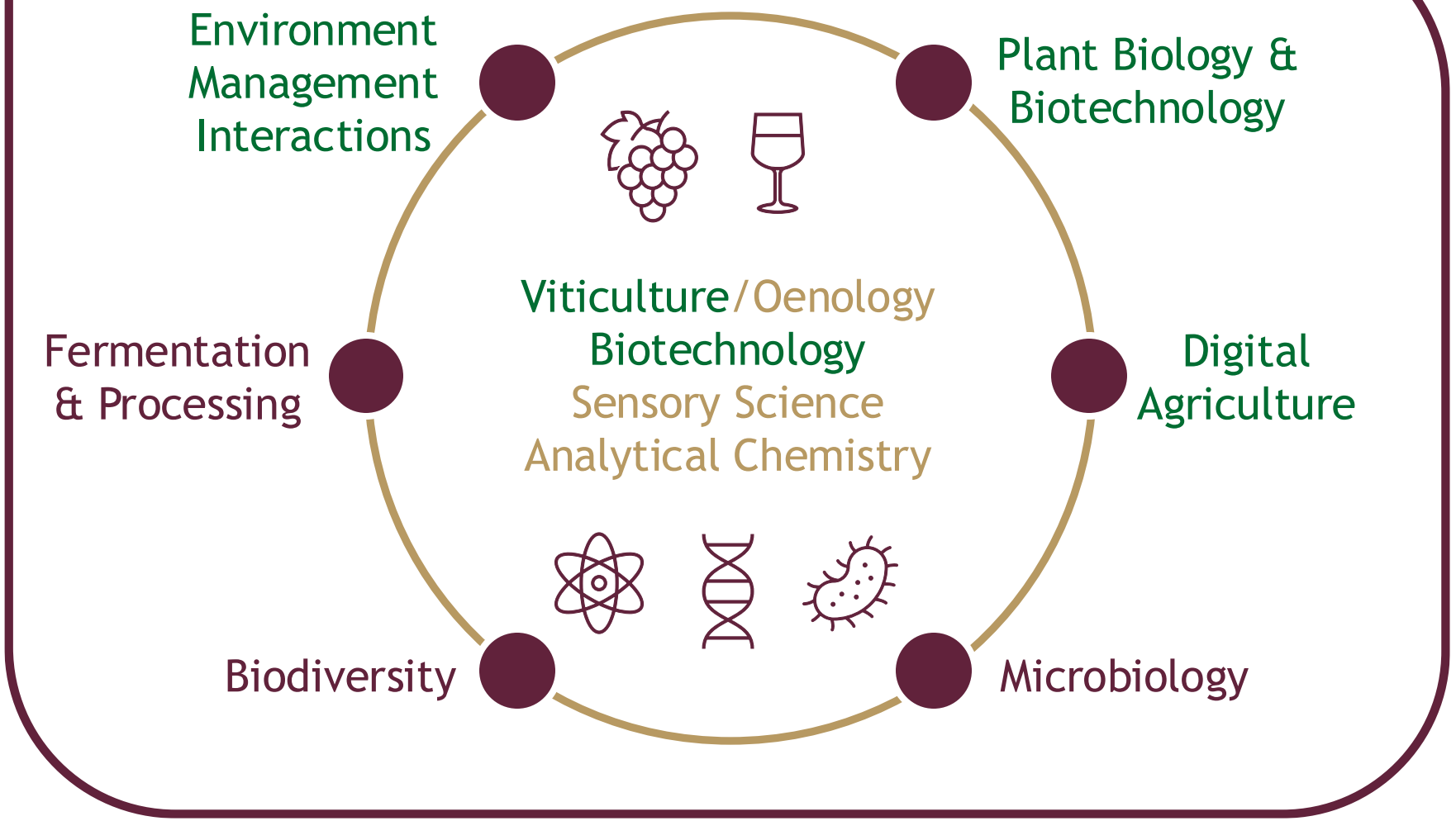
Degrees obtained:
2015: MSc(Agric) Viticulture (Stellenbosch University)
2009: BSc(Agric) Viticulture and Oenology (Stellenbosch University)

Work experience:
I have spent the greater part of my career in industry working as viticulturist for private producers. The practical experience gained over this years is has prepared me well for training new, upcoming viticulturists.

Current position:
Junior Lecturer (Viticulture)

RESEARCH THEMES

INTEGRATED GRAPE & WINE SCIENCES



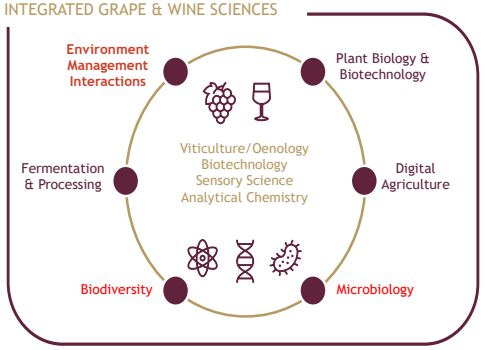
Viticultural advancement through Fundamental and Sustainable Scholarship and Collaboration

Dr Erna Blancquaert, Prof Evodia Setati & Dr Annelin Molotsi

Stellenbosch University
IYUNIVESITHI
UNIVERSITEIT

Environment Management Interactions

INTEGRATED GRAPE & WINE SCIENCES



Berry shrivelling in *Vitis vinifera L.* cv's and the impact on grape and wine quality in South Africa

- Principal investigators: Dr Erna Blancquaert, Distinguished Professor Markus Keller & Prof Michaela Griesser

FULBRIGHT

Washington State University

National Research Foundation

Universität für Bodenkultur Wien

ClimaVin: Exploring the influence of climate change on the microbial wine terroir: from vineyard soil to high quality wine

- Principal investigators: Dr Erna Blancquaert, Prof Zhanwu Dai & Prof Rafiq Hamdi

Stellenbosch University · University of the Western Cape · Ghent University · RMI · KU Leuven

Royal Meteorological Institute of Belgium

CREATION · PAUL CLUVER ELGIN · Chinese Academy of Sciences

National Research Foundation · Bosman Nurseries

中华人民共和国科学技术部 Ministry of Science and Technology of the People's Republic of China

belspo

Evaluating the impact of biostimulants on grapevine performance

National Research Foundation

- Principal investigators: Dr Erna Blancquaert; Co-investigator: Prof Evodia Setati; Collaborators: Prof Sam Crauwels & Markus Rienth

Ecklonia maxima

Citrus aurantium (bioflavonoids)

Protein hydrolysate

How biodiversity influence the sustainability of my vineyard

- Principal investigators: Dr Erna Blancquaert; Dr Annelin Molotsi; Dr Saskia Keestra & Dr Johanna Döring

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

Table and Raisin Grape Viticultural Research:

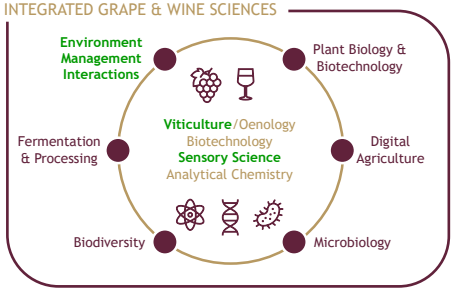
|Eunice Avenant

In collaboration with Dr Carlos Poblete, Talitha Venter, Dr Helene Nieuwoudt, Dr Philip Young, Dr Jeanne Brand, Dr Andries Daniels, Dr Nicolette Taylor, Jan Avenant

Stellenbosch University
IYUNIVESITHI
UNIVERSITEIT

Research themes

INTEGRATED GRAPE & WINE SCIENCES



Water use efficiency and water footprint assessment

- Quantifying seasonal total vineyard water use
- Quantifying seasonal vine water use (transpiration)
- Quantifying seasonal irrigation water use
- Vegetative and reproductive parameters linked to water use
- Physiological parameters linked to water use
  - Uncovered vineyards/ Under nets/ Under nets+plastic

Chemosensory profiling of table grapes

- Establish a workflow for sensory evaluation of table grapes
- Linking sensory attributes to the chemical profile of flavour compounds of table grapes

Source-sink relationships

- Impact of crop load on grape quality and harvest and after post-harvest cold storage
- Impact of shoot quality on grape quality and harvest and after post-harvest cold storage
- Impact of crop load on sensory attributes and flavour compounds of table grapes

Raisin grape trellis systems for drying-on-vine

- Evaluate trellis systems for drying-on-vine of different raisin grape cultivars
  - Vegetative and reproductive parameters linked to
  - Raisin quality
- Impact of pruning actions linked to drying-on-vine on grapevine carbohydrate status

Dormancy management

- Establish chilling requirements of new table grape cultivars through forced bud break studies

agriculture, land reform & rural development
Department: agriculture, land reform & rural development
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

SATI South African Table Grape Industry

Raisins South Africa

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

Plant cell wall biology applied to grape and wine sciences

Dr. John P. Moore

South African Grape and Wine Research Institute, Department of Viticulture and Oenology Stellenbosch University

OVERVIEW

Develop and establish an academic research programme in grapevine and wine sciences focused on plant cell wall biology

Screening table grape cultivars using rapid cell wall profiling tools for berry quality parameters

Table Grape Cell Wall Project

The crunchy texture of table grapes is one of the key quality parameters during production. This varies from cultivar to cultivar, stage of harvest and vineyard performance. Cell wall properties are key drivers of berry quality (e.g., pericarp firmness and intactness) at harvest and beyond. Common practise amongst producers is to continuously monitor firmness by evaluating pericarp appearance of cross-sectioned berries prior to harvest (Balic et al. 2022). These qualitative methods can be quite arbitrary and imprecise in their execution, but more quantitative, yet simple and high-throughput methods to evaluate these cell wall polymers are not yet readily available. A promising avenue is to link carbohydrate arrays targeting cell wall polymers with more traditional biochemical methods with rapid infrared spectroscopy tools to 'chemotype' the cell walls of cultivars at specific stages of development (ripeness) (Moore et al. 2014). The integration of datasets from a select number of cultivars, such as 'Crimson Seedless', 'Prime' etc. which are well known with less well characterised cultivars such as 'Autumn Crisp' offers a means to 'snapshot' or 'fingerprint' the cell wall chemotype using spectroscopic methods as well as assess performance in new geographical regions. The ultimate aim would be both to provide new knowledge on berry cell walls of important cultivars as well as progressing the potential development of infrared sensing technology for predicting table grape cell wall quality (predicting if grapes will progress to soft or firm berries). A Masters student is currently enrolled in the project.

References

Balic, I., Olmedo, P., Zepeda, B., Rojas, B., Ejsmentewicz, T., Barros, M., Aguayo, D., Moreno, A.A.,Pedreschi, R., Meneses, C., Campos-Vargas, R. (2022). Metabolomic and biochemical analysis ofmesocarp tissues from table grape berries with contrasting firmness reveals cell wall modificationsassociated to harvest and cold storage. Food Chemistry, 389, p.133052.

Moore, J.P., Fangel, J.U., Willats, W.G.T., Vivier, M.A. **(2014).** Pectic-β(1,4)-galactan, extensin andarabinogalactan-protein epitopes differentiate ripening stages in wine and table grape cell walls.Annals of Botany, 114(6), 1279-1294.

Astringency, cell wall polysaccharides and pectolytic enzymes in red wine

My broad research focus is application of plant cell wall profiling technologies in the grape and wine sciences. The work of Anscha Zietsmann, Yu Gao and Brock Kuhlman for their respective PhD projects focused on aspects of enzymatic deconstruction of wine grapes during winemaking and the impact on the polysaccharide profiles obtained. For example, the PhD study of Brock Kuhlman on astringency and polysaccharides builds on a previously published paper.

Wine astringency (a complicated phenomenon, combining lubrication, friction, physical detection, andpersonal sensitivity) increased in degree and its complex subqualities changed in the enzyme-crafted wines. The relationship between these wine-active chemical polymers and subsequent sensory perception were explored. This work was published as:

Kuhlman, B., Hansen, J., Jørgensen, B., duToit, W., & **Moore, J. P. 2022.** The effect of enzyme treatment on polyphenol and cell wall polysaccharide extraction from the grape berry and subsequent sensory attributes in Cabernet Sauvignon wines.
Food Chemistry, 38, 132645.

Brock Kuhlman, Jose Luis Aleixandre-Tudo, **John P. Moore*,** Wessel du Toit**. 2024.** Arabinogalactan proteins and polysaccharides compete directly with condensed tannins for saliva proteins influencing astringency perception of Cabernet Sauvignon wines. Food Chemistry 137625.(published)

Brock Kuhlman, Jose Luis Aleixandre-Tudo, **John P. Moore*,** Wessel du Toit**. 2024.** Astringency perception in a red wine context – a review. Oeno One (published).

Biostimulants/Bioprotectants Project

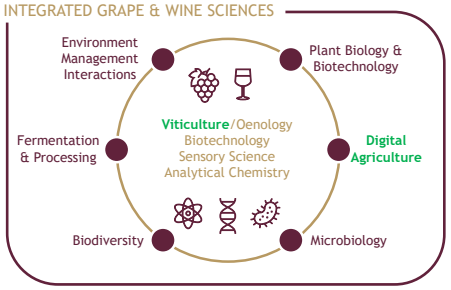
Climate change scenarios predict ever increasing frequency of drought events and coupled with disease outbreaks poses survival risks to perennial fruit crops such as grapevine. The combination of drought and disease is becoming more widely studied in grapevine research with powdery mildew a pathogen which can infect under relatively dry conditions being a major pathogen in South African and French vineyards. The use of plant biostimulants/ biocontrol agents are promising approaches as these naturally occurring compounds are non-toxic and are believed to be able to modify the leaf microbiome leading to enhanced plant health and immunity. The motivation of this study is to investigate if 1; plant biostimulants/ biocontrol agents can alter the phyllosphere microbiome and 2; these changes result in enhanced plant health and immunity when challenged bythe dual stressors of drought (abiotic) and powdery mildew infection (biotic). A Masters student is currently enrolled in the project.

Digital Agriculture "New Tools for Precision Management"

Prof Carlos Poblete-Echeverria and Talitha Venter

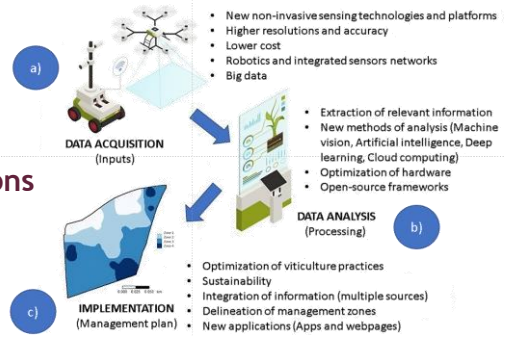
Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Research themes



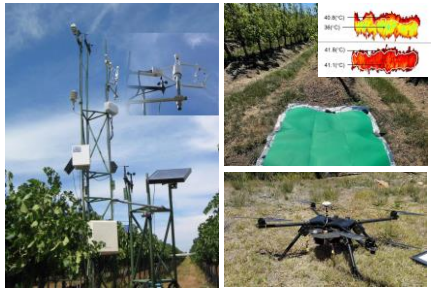
DA concept

"**Digital agriculture (DA)** can be defined as a group of **new technologies** (sensors, platforms, and algorithms) used to provide technology solutions to handle **spatial** and **temporal variability** of agriculture variables and site conditions in order to provide useful information for **optimizing management practices**"

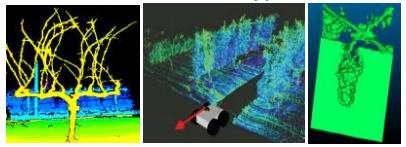


DA Smart applications

A. Water management and water stress detection

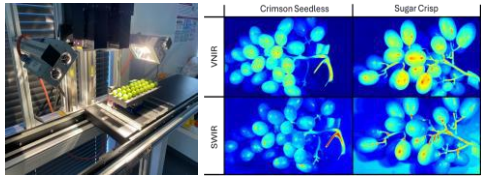


B. Yield estimation and canopy characterization

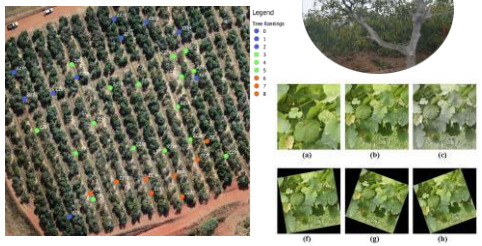


C. Monitoring of microclimate and soil conditions

D. Estimation of fruit quality parameters



E. Monitoring of pest and disease symptoms



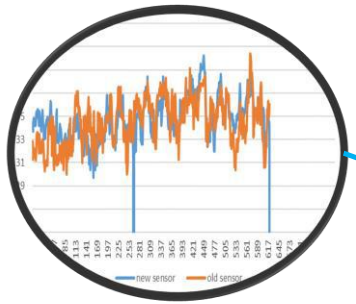
DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

Vineyard (sensor) robot

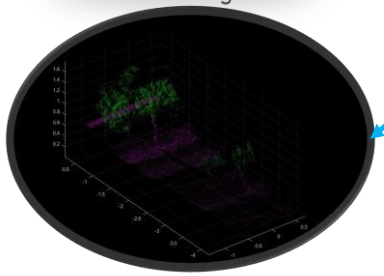
Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

SAGWRI South African Grape and Wine Research Institute

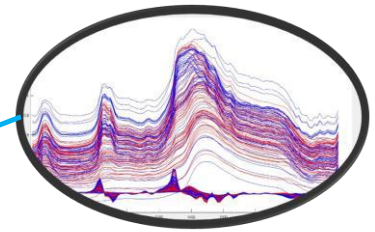
Thermometry: Sensors at different canopy height for canopy temperature monitoring



Lidar: used for canopy characterization and sizing



On-the-go spectrometer: water stress estimation

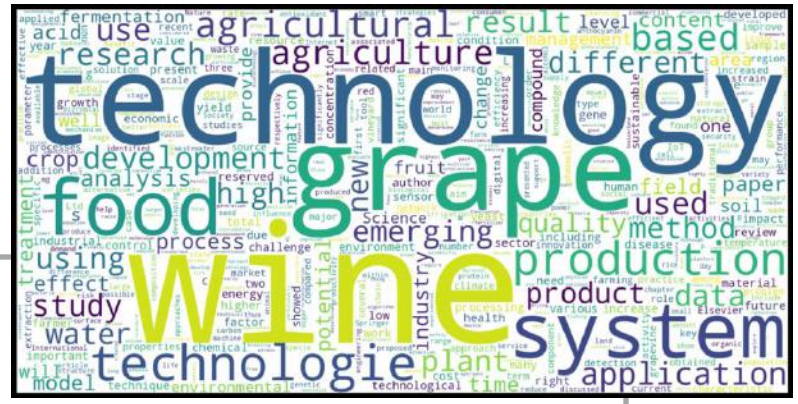


RGB: canopy characterisation

AgriSciences · EyeNzululwazi ngeZolimo · AgriWetenskappe

Dr AE Strever

"Innovation and entrepreneurship in Agriculture with a focus on grapes and wine"



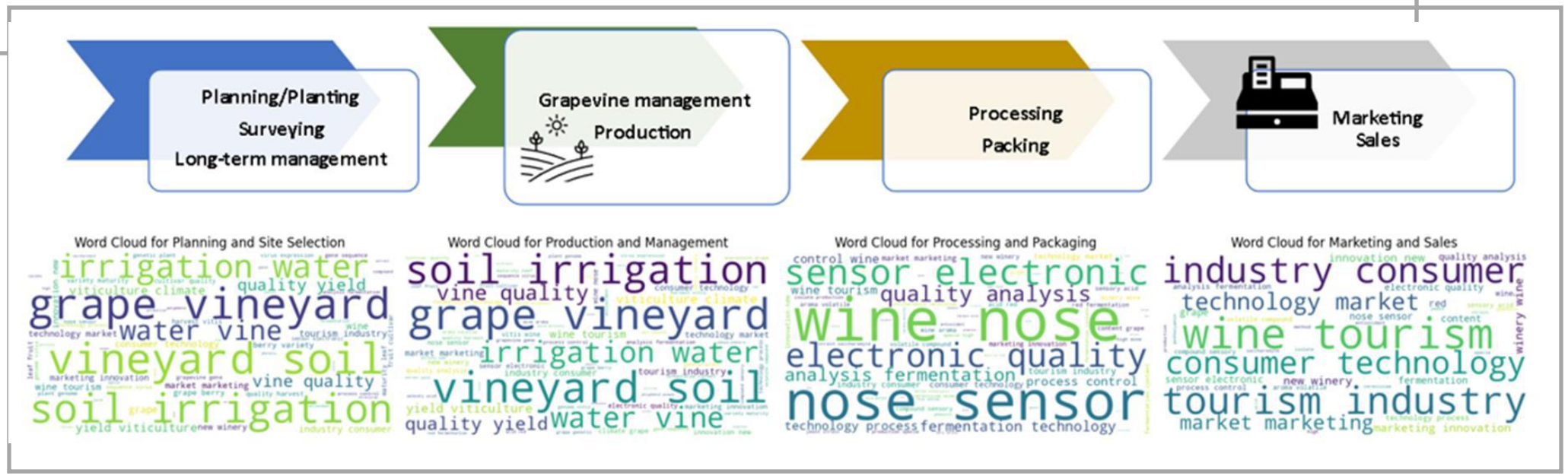
Research domains

2002-2018: Grapevine cultivation/balance and remote sensing

2018-2022: Research hiatus: Data management, entrepreneurship and innovation coordination

Current and future direction/interest: Industrial engineering applications in agriculture/grape & wine industry:

- Topic modelling (a form of AI) for scoping/scanning studies and sensory language corpus creation
- Data intelligence/integration and supply/value chain mapping of emerging technologies (i.e Blockchain/RFID/circular-economy-related).
- Engineering management applications in agriculture – leadership, strategy, technology/project management.
- Teaching-related research – curriculum augmentation, AI systems for agricultural education, entrepreneurship development.



Dr Albert Strever
(aestr@sun.ac.za)

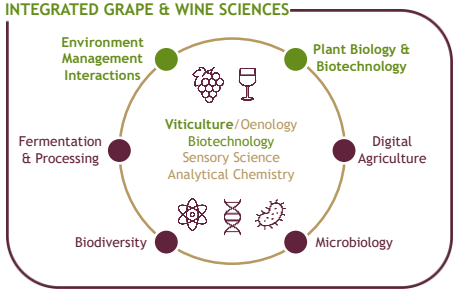
THE PLANT GROUP:
Mission: To study grapevines and improve their resilience to stresses

| Melané Vivier, Anscha Zietsman and Philip Young

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

We contribute to the following Research Themes:

INTEGRATED GRAPE & WINE SCIENCES



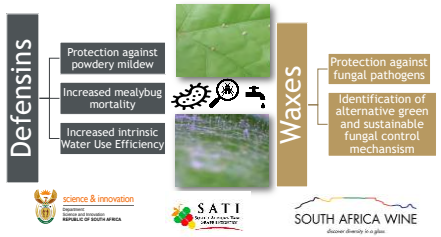
We develop and use transformation systems to study and improve vines

Collaboration with Dep of Botany (Prof Makunga) and University of Gent (Prof Alain Goossens); Genetics (Prof Burger/Dr Campa) and Ms Phyllis Burger (ARC - Nietvoorbij/Infruitec)

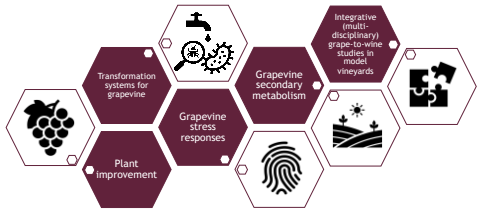
Transformation systems for grapevine
- Stable *Agrobacterium*-based **transformation** of somatic embryos
- Grapevine **Protoplasting**
- Grapevine **Hairy Roots** as a screening system to test strategies and finding the functions of genes

Plant Improvement
- **CRISPR-approaches** to improve resilience to **water stress**
- Increasing **Pinotage Diversity: New clones, using gamma irradiance**

We use knowledge gained to develop/test stress protection approaches



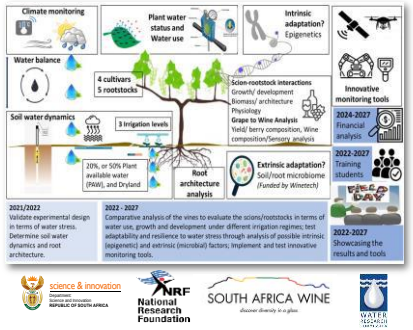
Our project topics include:



We develop multidisciplinary projects in model vineyards to study/showcase grapevine's resilience to stress, and environmental impacts on product quality

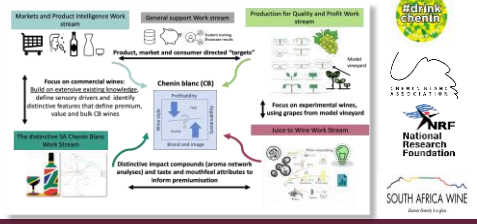
- Water Flagship projects: Adaptation and Resilience of Grapevine Scion/Rootstocks to Water Limitation

In collaboration with Proff Poblete, Setati, Dr Berry, and Ms Venter



- Premiumisation and Value Growth of South African Chenin blanc wines

In collaboration with Proff Bauer, W du Toit, M du Toit, B Divol, E Setati, C Poblete, Drr A Berry, A Strever, E Terblanche, H Theron, J Brand and Ms T Venter



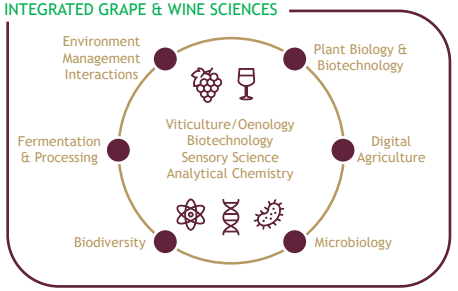
Grape4Green: A systematic review to evaluate circularity in the grape and wine industry and identify prospects and strategies

Melane Vivier, Anscha Zietsman, Annie Chimphango, Albena Lederer, Helen Pfukwa, Erik Wolfaardt

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Research themes

INTEGRATED GRAPE & WINE SCIENCES



Who we are:

- This research group is a collaboration between SAGWRI, Chemical Engineering and Polymer Sciences, supported by an Industry Advisory Group.

Aims:

- To conduct a scoping study on the state of the art of the circular economy (CE) in the SA Grape and Wine Industry, to formulate a clear definition of the concept and to identify barriers preventing progress towards this sustainability goal.
- To identify existing and new circularity pathways with high potential benefits, for further research.

Proposed definition of a Circular Economy*

The Circular Economy is a resilient economic system aimed at promoting sustainable development by targeting environmental quality, economic development, and social equity. It is based on three principles, driven by design:

1) Eliminate waste and pollution,
2) Circulate products and materials (at their highest value), and
3) Regenerate nature

It is underpinned by a transition to renewable energy and materials and achieves its highest potential when implemented on a system-wide, multi-level (micro-, meso- and macro-) scale.

Value of the project to the industry:

- A comprehensive summary of CE initiatives in the industry.
- Recommendations on new circularity pathways, their barriers and potential enablers.
- Guide for choosing future research that give the best return on investment.
- Network of stakeholders to drive/promote CE in a structured and coordinated manner
- Development of skills and technical knowledge

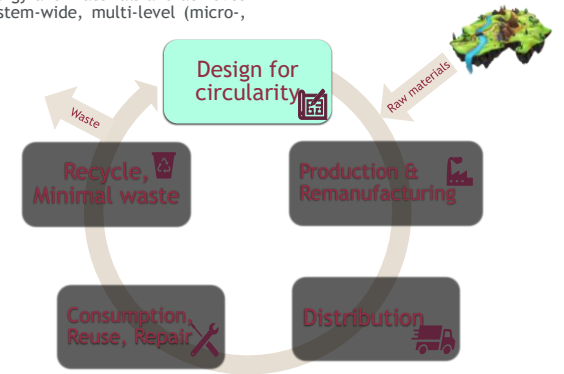


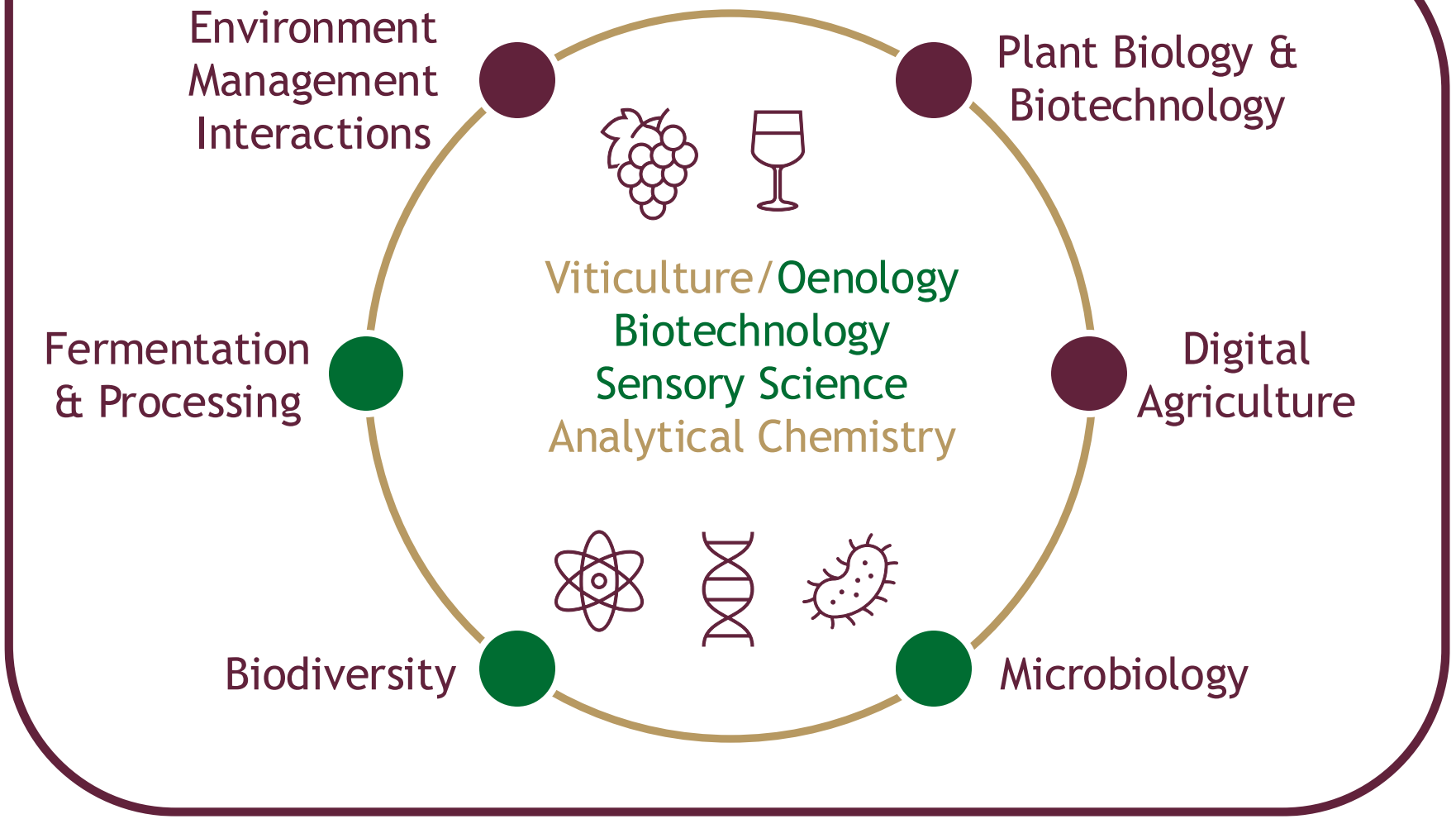
Figure 1: Typical aspects of a circular economy

*Definition adopted from following definitions in literature:

1. What is a circular economy? | Ellen MacArthur Foundation. https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview (accessed June 29, 2023).
2. J. Kirchherr, D. Reike, M. Hekkert, Conceptualizing the circular economy: An analysis of 114 definitions, Resour Conserv Recycl 127 (2017) 221–232. https://doi.org/10.1016/J.RESCONREC.2017.09.005.

RESEARCH THEMES

INTEGRATED GRAPE & WINE SCIENCES

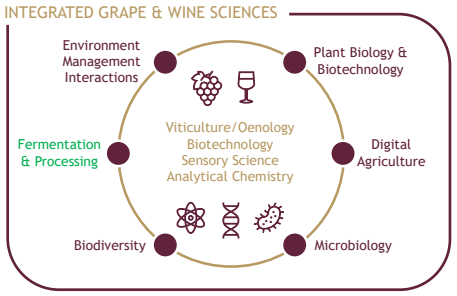


Wine production: chemical and sensory impacts

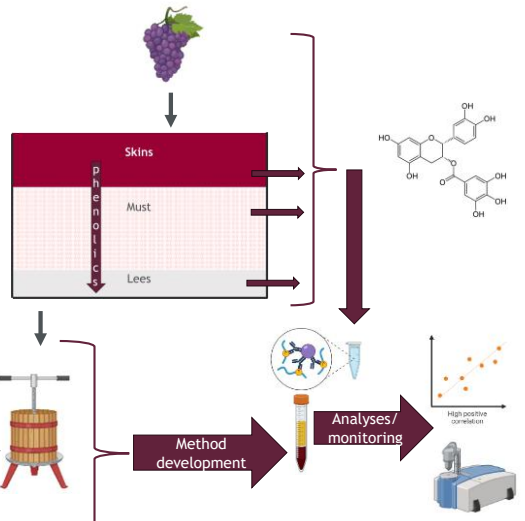
Wessel du Toit

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

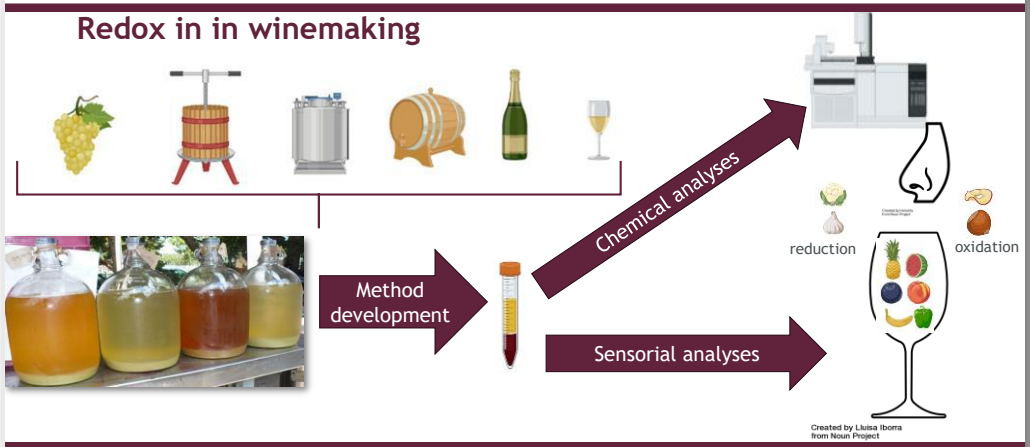
Research themes



Phenolics in red winemaking



Redox in in winemaking



DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

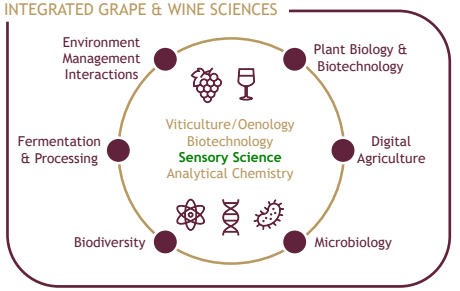
Wine Sensory Research:
A Collaborative Transdisciplinary Approach

| Dr Jeanne Brand

In collaboration with Prof Melané Vivier, Prof Wessel du Toit, Dr Albert Strever, Eunice Avenant, Prof Dominique Valentin, Dr Melissa van der Merwe, Dr Sulette Oelofse & Dr Carien Coetzee Basson

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Research Themes



Key Project Involvement

- Cross-cultural Consumer, sensory & Chemical data fusion
- Aroma Wheel Development
  - SA Shiraz & Sauvignon Blanc
  - SA Chenin Blanc In African Languages
- Chenin Blanc Premiumisation
  - Distinctive SA Chenin Blanc Workstream
- De-alcoholised Wine Analysis & Investigation
- Automated Sensory Attribute Consolidation, Analysis & Visualisation
- Food & Wine Pairing – Traditional SA Food
- Canine & Human Detection of Cork Taint

Grape & Wine Sensory Analysis

- Rapid Sensory Methods
- Difference & Similarity Testing
- Traditional Descriptive Methods
  - Descriptive Analysis
- Affective Testing
  - Consumer preference & Liking
- Quality Scoring & Typicality Rating
  - Wine Industry professionals' experience

Sensory Method Development

- Small volume samples
- Large sample sets
- Quality Assessment
- Rapid Methods
- Wine Fault detection
  - Human & canine detection
- Digital sensory methodologies

Lexicon/Language, Data Science & Sensometric Studies

- Data Science Tools to Process Sensory Description
  - Latices & Networks to Analyse "consumer web data"
  - Creating Automated Visualisation Workflows
  - NLP for description in African languages
- Integrating Sensory, Vineyard & Climate Data

Cross-cultural & Consumer Research

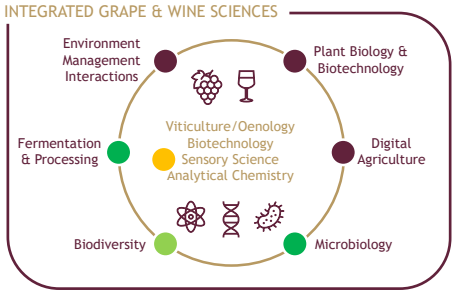
- South African Cultivar Wines
  - Description in African languages
  - Aroma wheel construction
- Perception & Preference
  - Multiple languages & cultural groups
- Wine & Food Pairing
  - Influence on liking

SHIRAZ SA · SOUTH AFRICA WINE · science & innovation

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

Research Program of the SA Research Chair in Integrated Wine Sciences

| Florian Bauer

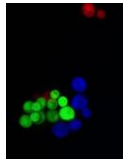


NRF/DSI RESEARCH CHAIR IN INTEGRATED WINE SCIENCE

From knowledge generation to innovation

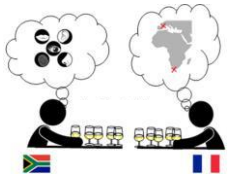
From microbial ecosystems to novel yeast strains to innovative fermentation management tools

Research Themes of Research Chair



- Microbial ecology and evolution: How to better exploit wine microbial biodiversity
  - The wine fermentation ecosystem: From natural biodiversity to consortia to species/strain pairings
  - Co-evolution of species and synthetic ecology: Biotic selection pressures as drivers of evolution for yeasts, algae and LABs
  - Modelling ecosystems: The fermentation ecosystem as a model for microbial ecology
  - Innovative tools for fermentation management: Intelligent exploitation of natural wine ecosystems

- Yeast Biotechnology
  - Yeast cell wall chitin: Reducing protein haze through biology
  - Fructophilic yeast strains
  - Yeast Nutrition
  - Novel yeast for cider production: Targeting Aroma diversification



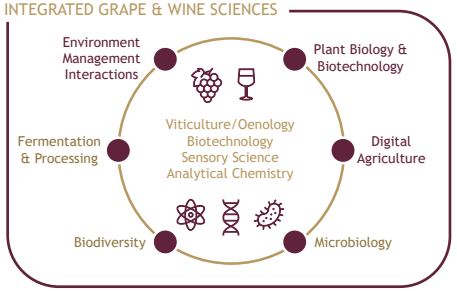
- Thinking "wine" – from mental concept to sensory perception
  - Making wine without grapes – what makes wine "wine"? A sensory-driven approach
  - Mental wine representations – what is the impact of cultural history on the idea of "wine"

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

LACTIC ACID BACTERIA impact on wine and MICROBIAL SPOILAGE

| Maret du Toit

Research themes



Yeast and LAB interactions

- Development of methodologies to understand interactions
  - Transcriptomic
  - Untargeted metabolomic
- Studying interactions of both *O. oeni* and *L. plantarum*
  - Co-inoculation vs Sequential
  - *Saccharomyces cerevisiae*
  - Non-*Saccharomyces* yeasts
  - Direct contact and non-physical contact in bioreactors

Microbial spoilage

- Biogenic amines – lactic acid bacteria
- *Zygosaccharomyces*
- *Brettanomyces*

Development of MLF starter cultures

- Selecting naturally isolated LAB species and strains to address industry needs related to MLF
  - Developed first mixed species MLF starter
  - Low pH MLF starters
  - Ethanol tolerant MLF starters
  - Bioprotection ability of LAB strains
  - Using directed evolution to improve strains for MLF

Enzymes from LAB as resource

- Beta-Glucosidase
  - To reduce smoke-taint
- Lyases
  - Release of aromas – such as diacetyl
- Phenol acid decarboxylase
  - Volatile phenols

Solving industry problems

- Contract research for companies

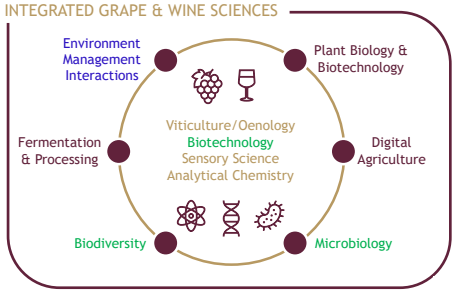
DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

Tapping into the vineyard microbiome for sustainable and climate resilient grape and wine production

| Evodia Setati (Microbiomics Group)

Stellenbosch University
IYUNIVESITHI
UNIVERSITEIT

Biodiversity, Microbiology and Biotechnology

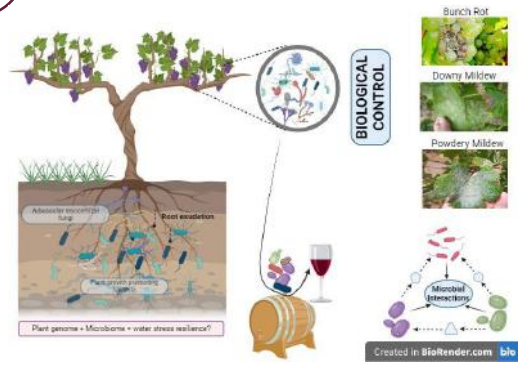


Biocontrol agents against phytopathogens

- Isolation, identification and screening of yeast and bacteria from the vineyard and grape must
  - Developing microbial consortia with compatible isolates displaying different modes of action
  - Evaluate the influence of biocontrol agents on wine fermentation
  - *Collaborators: Drs. Neil Jolly, Heinrich du Plessis, Arina Hitzeroth*

Microbiome diversity and dynamics

- Unravelling geographical delineation of grapevine associated microbiota
  - Using high throughput sequencing technology to identify fungi and bacteria associated with different grape varieties from different locations
- Assessing the influence of farming practices on vineyard microbiota
  - Cover crop applications
  - Biostimulant applications
  - *Collaborator: Dr. Erna Blancquaert*



Grapevine-microbiome interactions

- Evaluating soil and rhizosphere microbial diversity and function in grapevine scion/rootstocks receiving different irrigation levels
  - *Collaborators: Water Flagship 3 team, Prof. Melané Vivier*
- Evaluating interactions between grapevine, soil microbiota and microbial inoculants developed for plant growth promotion and biocontrol
  - *Collaborators: Dr. Erna Blancquaert, Prof. Joana Falcao-Salles*

university of groningen

Microbial interactions

- Developing multi-species yeast consortia (e.g., 8 yeast species consortium)
  - Evaluate population dynamics during wine fermentation with different inoculation strategies to understand key drivers in spontaneous fermentation
  - Identify co-operative or competitive patterns between species
  - Identify factors that influence the interactions between the species
  - Use information to develop strategies for better management of mixed culture fermentations
  - *Collaborators: Prof. Florian Bauer*

SOUTH AFRICA WINE
discover diversity in a glass

NRF National Research Foundation

science & innovation
Department: Science and Innovation
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

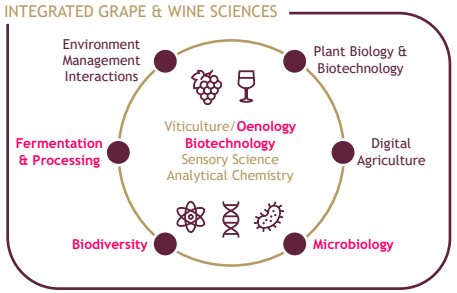
Winesteins: exploring yeasts to promote diversity

Making bad wine a thing of yeasterday

| Benoit Divol

Stellenbosch University
IYUNIVESITHI
UNIVERSITEIT

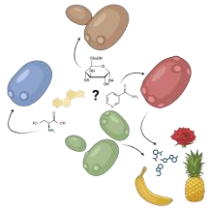
Research themes



Fingerprinting and characterisation of wine yeasts

- **What is this about?**
  - Unravelling yeast diversity
  - Screening for and uncovering properties/traits of oenological interest
- **What for?**
  - Enhancing knowledge on yeast diversity
  - Selecting novel yeast strains for the wine industry

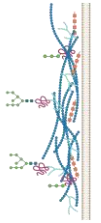
Wine yeast physiology and ecophysiology



- **What is this about?**
  - Characterising fermentation performance, yeast survival and adaptation
  - Unravelling the uptake and metabolism of nutrients
  - Assessing the impact of environmental conditions
  - Improving yeasts genetically
- **What for?**
  - Enhancing understanding of yeast contribution to wine flavour profile
  - Steering metabolism to diversify wine styles
  - Designing and selecting yeasts with enhanced properties for the wine industry

Extracellular enzymes and cell wall biochemistry

- **What is this about?**
  - Exploring the diversity and properties of microbial hydrolytic enzymes (pectinases, glucanases, glycosidases, proteases, killer toxins) and cell wall mannoproteins
- **What for?**
  - Facilitating grape juice and wine processing
  - Contributing to wine flavours
  - Combatting yeast spoilage



Funding

LALLEMAND
LALLEMAND OENOLOGY
Original by culture

NRF National Research Foundation

OENOBRANDS
ADVANCED WINEMAKING SOLUTIONS

Stellenbosch University

SOUTH AFRICA WINE
discover diversity in a glass

Fermentis by Lesaffre

AMBASSADE DE FRANCE EN AFRIQUE DU SUD

DEPARTMENT OF VITICULTURE & OENOLOGY (DVO)
Faculty of AgriSciences
SOUTH AFRICAN GRAPE & WINE RESEARCH INSTITUTE (SAGWRI)
Stellenbosch University

FAQs: Research

What topics are available currently?





POSTGRADUATE PROJECT PITCHES FOR 2025

SAGWRI Project Portfolio for 2025

1. Adaptation and resilience of grapevine to limiting water. Prof Melane Vivier
2. ReGenWine - regenerative agriculture in vineyards. Prof Melane Vivier and Ms Julia Harper
3. Digital Agriculture. Prof Carlos Poblete-Echeverria (4 projects available)
4. Data and technology intelligence for the South African grape and wine industries. Dr Albert Strever
5. Biocontrol of grapevine fungal pathogens. Prof Evodia Setati
6. Grape4Green From grape waste to delivery devices for improved biocontrol application. Prof Melane Vivier
7. Investigating a model microbial ecosystem. Prof Florian Bauer
8. Characterising the yeast killer activity of *Lachancea* spp. Prof Benoit Divol
9. Premium and Profitable Chenin blanc Wines. Prof Florian Bauer et al
10. Calcium Tartrate instability in SA wines. Prof Wessel du Toit and Prof Melane Vivier
11. Wood ageing regime for small scale winemaking. Prof Wessel du Toit
12. Canine and human sensory detection of chemical compounds responsible for cork taint. Dr Jeanne Brand
13. Cross-cultural consumer preferences of table grapes. Dr Jeanne Brand and Ms Eunice Avenant
14. Investigating relationships between sensory characteristics of commercial single vineyard wines. Dr Jeanne Brand and Dr Albert Strever
15. Maintaining and enhancing table grape Quality: Overhead Nets and Plastic as Climate-Improving Systems. Mrs Eunice Avenant
16. Optimising Grape Quality: Rain Protection Covers for Harvest Timing Manipulation of Table Grapes. Mrs Eunice Avenant
17. *Zygosaccharomyces*: is there a crisis looming in low alcohol wines? Prof Maret du Toit
18. Plant biostimulants for altered microbiome and enhanced plant health in cultivated grapevine. Dr John Moore

Plant biostimulants for altered microbiome and enhanced plant health in cultivated grapevine

The following project is available for a **Masters** study from 2025, for a suitable student with a BSc (Hons) in Biochemistry, Botany, Microbiology, Biotechnology or related discipline as well as a BScAgric in Plant Pathology or related Agricultural field/background.

Project Theme: Plant biostimulants for altered microbiome and enhanced plant health in cultivated grapevine

Project description: Climate change scenarios predict ever increasing frequency of drought events and coupled with disease outbreaks poses survival risks to perennial fruit crops such as grapevine. The combination of drought and disease is becoming more widely studied in grapevine research with *Botrytis cinerea* a fungal pathogen which can infect under a variety of environmental conditions being a major pathogen in South African and French vineyards. The use of plant biostimulants/biocontrol agents are promising approaches as these naturally occurring compounds are non-toxic and are believed to be able to modify the leaf and root microbiome leading to enhanced plant health and immunity. The motivation of this study is to investigate if 1; plant biostimulants/ biocontrol agents can alter the phyllosphere and rhizosphere microbiome and if 2; these changes result in enhanced plant health and immunity when challenged by the dual stressors of drought (abiotic) and fungal *Botrytis cinerea* infection (biotic).

Please send a CV, as well as a cover letter to Dr John P. Moore (moorejp@sun.ac.za) to indicate your interest in this opportunity.

Please note that if you are interested in PG study at SAGWRI; you must apply via the Stellenbosch University portal. You will find all the necessary information and important dates and deadlines at How to apply (sun.ac.za)

Contact person for the project: Dr John P. Moore (moorejp@sun.ac.za)

General contacts for SAGWRI:

Prof MA Vivier: Director of SAGWRI (mav@sun.ac.za)

Mr. Charl Newman: Postgraduate Admin officer (cnewman@sun.ac.za)

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

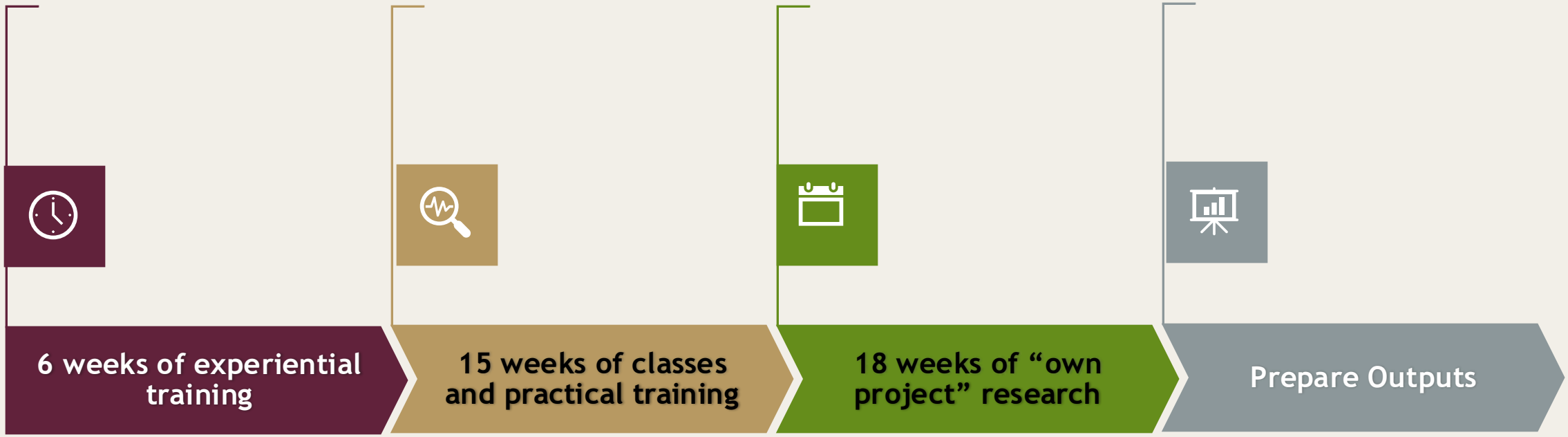
FAQs:

1. What does the Honours include?
2. Are there classes in the MSc's and PhD's?
3. How long does it take to complete the degrees?

FAQ: What is the typical Honours timeline and activities?

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Hons: 1 year

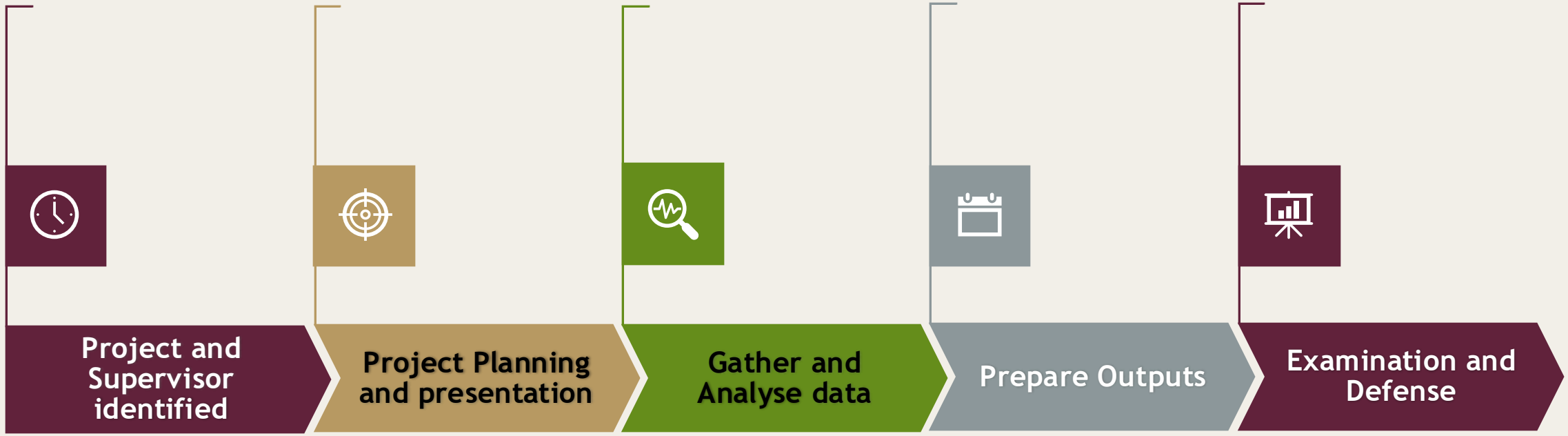


- "Learning by doing"
- Skills training workshops
- "Supported" independence

FAQ: What are the typical MSc and PhD timelines and activities?

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together
sonke siya phambili
saam vorentoe

MSc: 1-2 years; PhD: 3-4 years



- Skills training workshops
- Presentations at conferences
- International exchanges

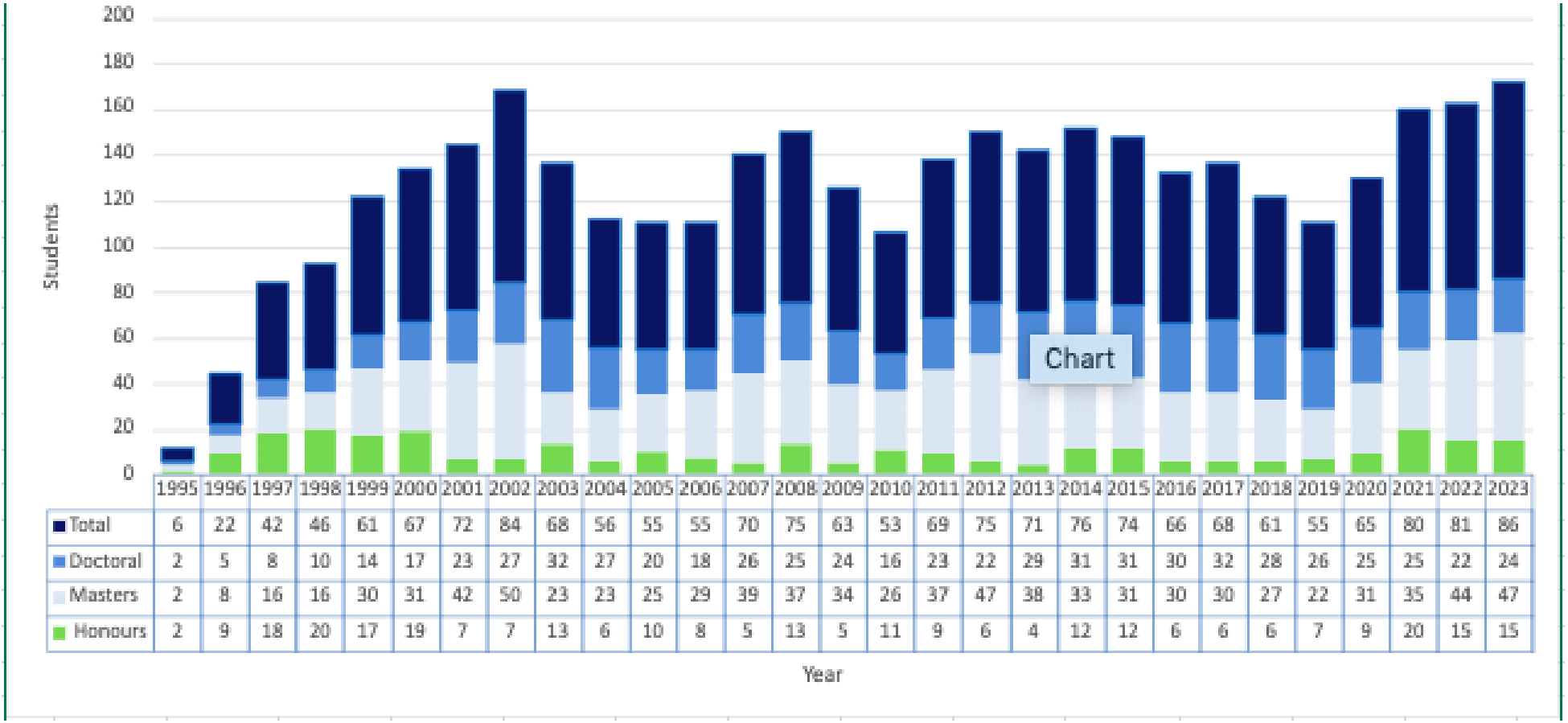
FAQ: How many students do you have? And how many places do you have available?

SAGWRI
South African Grape and Wine Research Institute

Goals:

Trans-disciplinary training; graduation in minimum periods (throughput), and building a productive, well-rounded and thriving student core

Registered PG students (1995-2023)



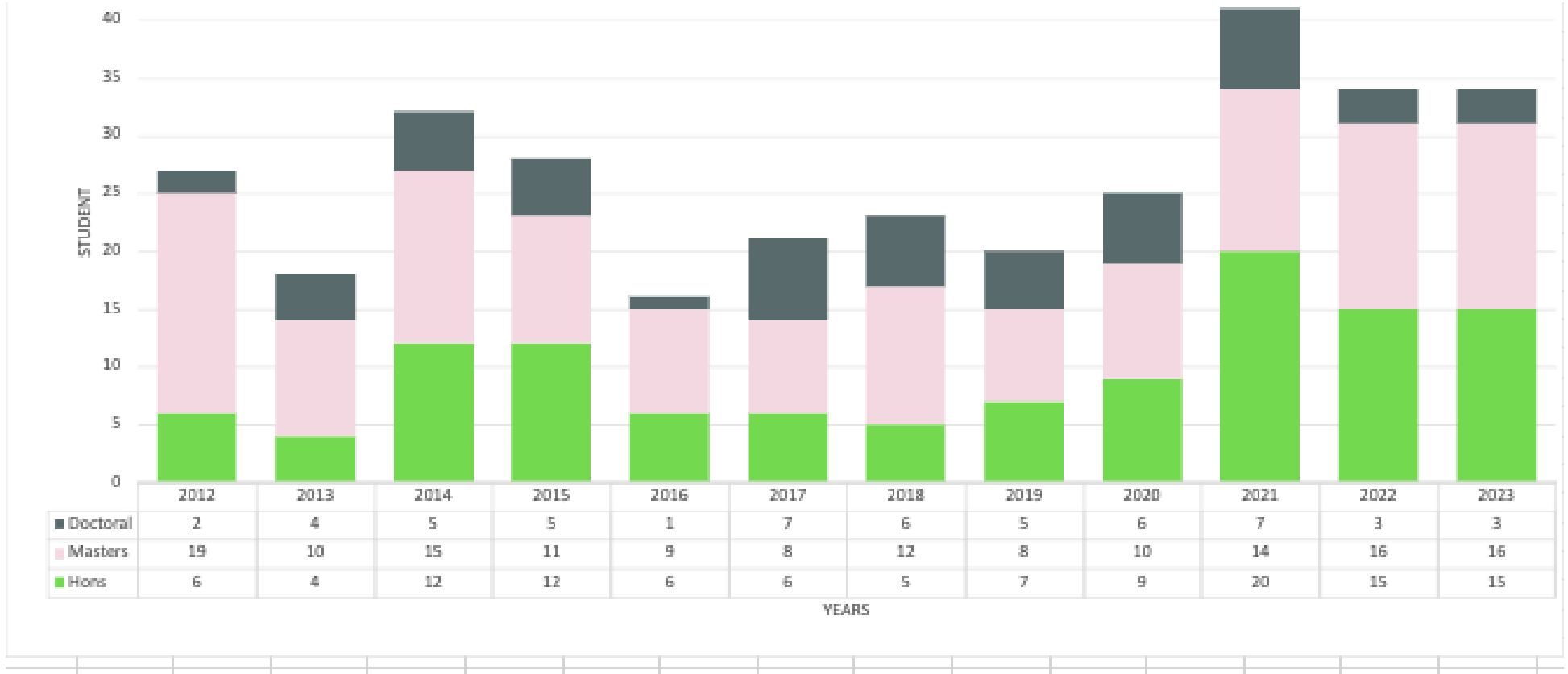
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	6	22	42	46	61	67	72	84	68	56	55	55	70	75	63	53	69	75	71	76	74	66	68	61	55	65	80	81	86
Doctoral	2	5	8	10	14	17	23	27	32	27	20	18	26	25	24	16	23	22	29	31	31	30	32	28	26	25	25	22	24
Masters	2	8	16	16	30	31	42	50	23	23	25	29	39	37	34	26	37	47	38	33	31	30	30	27	22	31	35	44	47
Honours	2	9	18	20	17	19	7	7	13	6	10	8	5	13	5	11	9	6	4	12	12	6	6	6	7	9	20	15	15

SAGWRI
South African Grape and Wine Research Institute

Goals:

Wellness; Student success*; quality outputs

PG Graduandi Numbers (2012-2023)



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Doctoral	2	4	5	5	1	7	6	5	6	7	3	3
Masters	19	10	15	11	9	8	12	8	10	14	16	16
Hons	6	4	12	12	6	6	5	7	9	20	15	15

<u>Projected</u> Available Positions: 15- 20 Hons; 20 MSc's and 10 PhD's

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

FAQ:

What can you do with these degrees? Will I not be overqualified if I want to find a job in industry?

Hons

- Assistant winemakers
- Quality control officers
- Technicians
- Jnr researchers/analysts
- Entrepreneurs

Masters

- Assistant winemakers/ winemakers
- Quality control managers
- Product Specialists
- Analysts/Researchers/ Jnr lecturers
- Entrepreneurs

PhD

- Academic/Research Careers
- Managers/Directors
- Own businesses
- Entrepreneurs

Doctoral Graduate Attributes

1 Broad Knowledge

The graduate has acquired well-informed relevant knowledge in the selected field or discipline. Through an original contribution achieved through independent study, the graduate integrates new with existing knowledge, thereby advancing the frontiers of knowledge. In addition to being well-informed about and well-versed in the literature in a chosen field, the graduate is able to make a contribution to the relevant evolving debates in the field.

2 Specialised Knowledge

The graduate demonstrates expert, specialised, and in-depth current knowledge of a specific area of research, which will be evident in the thesis or equivalent.

3 Insight into Related Fields

The graduate demonstrates awareness of how the specific area of research relates, or is relatable, to other fields of study and practice which will be evident in the doctoral work.

4 Ethical Awareness

The graduate demonstrates awareness of, and compliance with, the principles of ethics in research and, where relevant, professional protocols, which will be evident in the in-depth discussion in the thesis or equivalent.

5 Original Contribution

The graduate shows evidence of original and innovative thinking in research and, where applicable, creative practice and/or performance, which makes a special and novel contribution to the field of study.

6 Appropriate Methodologies

The graduate demonstrates knowledge of, and the ability to create and introduce, where appropriate, and to evaluate, select and apply relevant research designs, approaches, methodologies, instruments, and procedures, appropriate for the doctoral work undertaken.

7 Reflection and Autonomy

The graduate demonstrates ability to conceptualise and reflect critically, work independently, and arrive at defensible conclusions and solutions, based on appropriately-substantiated and defensible premises and analysis.

8 Communication and Digital Literacy Skills

The graduate demonstrates an advanced level of communicative competence through capacity for rigorous academic writing, including relevant digital literacy skills, and ability to relate individual research with reference to, and critical analysis of, related research by scholars in the relevant knowledge domain(s). The graduate is able to communicate, defend and disseminate their research findings effectively to expert and non-expert audiences.

9 Critical Thinking for Problem Solving

The graduate demonstrates ability to conduct research-related critical and analytical thinking, which shows an intellectual competence for problem-solving in diverse contexts, both familiar and unfamiliar.

In 2018, South Africa's Council for Higher Education (CHE) released a Qualification Standard for Doctoral Degrees. The Standard prescribes a set of nine graduate attributes - five knowledge attributes and four skills attributes - that doctoral graduates must master to meet the degree requirements. The graduate attributes will be assessed within the context of the purpose of the qualification. The purpose and level of the qualification will have been achieved when all the attributes are evident. It is thus important for all doctoral candidates to ensure that they keep these attributes in mind and consider how they will develop these throughout their doctoral journey.

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

General Application and Selection Procedures

FAQs: How do I apply and what are the entry requirements?

- Apply through SunStudent:
  - http://www0.sun.ac.za/pgstudies/how-to- apply.html
  - Your academic transcripts will be requested via SU Administration
  - Entry requirements: an aggregate of at least 60% in your main subjects during your final year.

POSTGRADUATE STUDIES

Welcome to Stellenbosch University's prospective postgraduate student website!

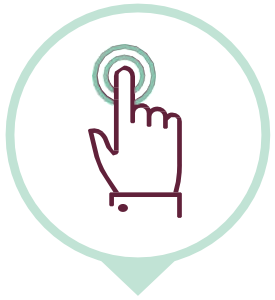
Open up a world of possibilities by exploring our postgraduate programme offering and joining our postgraduate community.
Our excellent research profile attracts postgraduate students in pursuit of advanced research degrees.

SUPPORTING DOCUMENTS

- Division for Research Development
- Library and Information Services
- Prospective Undergraduates
- Latest SU News
- Term Dates

APPLICATION PROCESS

How to apply for
POSTGRADUATE PROGRAMMES
on the Stellenbosch and Tygerberg campuses



SELECT A PROGRAMME

Check out on What can I study? on the Prospective Postgraduate Student website for possible programme choices or browse the University Calendar.

MEET THE ADMISSION & SELECTION CRITERIA

Make sure you meet the minimum criteria for the programme(s) before you apply.

Admissions Policy

Admission Criteria

APPLY ONLINE

Submit your application before the closing date.

You can apply here.

Application documents

TRACK YOUR APPLICATION STATUS

Log in to the Applicant Portal to track your application status.

ACCEPT OUR OFFER AND UPLAOD YOUR SIGNED CONTRACT

If we make you an offer you must accept it by the deadline, and upload your signed student contract to join our postgraduate community!

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

RESOURCES Here is a list of all the useful links that you'll find throughout this document.

GET IN TOUCH For help or information, contact Client Services at 021 808 9111, e-mail info@sun.ac.za or visit www.sun.ac.za/pgstudies. Remember to use your Applicant ID when you contact us.

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

General Application and Selection Procedures

The application process

6.1 CLOSING DATES

International South Africa

MSc and PhD – deadline for application on the SUN system:
South African applicants: 31 October 2024
International applicants: 14 September 2024

- **Conditional selection** of candidates: July-October 2024
- **Offer for PG study** is made (by us to you)
- Confirmation from you leads to a **"Provisional Acceptance"** status for PG study
- **Final acceptance** November-December (after final marks are available on the university systems (if all entry requirements are met)

FAQ: What about financial support?

Bursaries

- To cover living and study costs
- Project costs are covered by supervisors
- NRF and SU postgraduate bursaries require a **65%** average
- Proof of bursary applications will count in your favour when final selections are made

NRF Bursaries

Deadline 5 July 2024 (MSc/PhD)

Passed for 2025

SU PG Bursaries

Project-based bursaries

(dependent on record of unsuccessful applications)

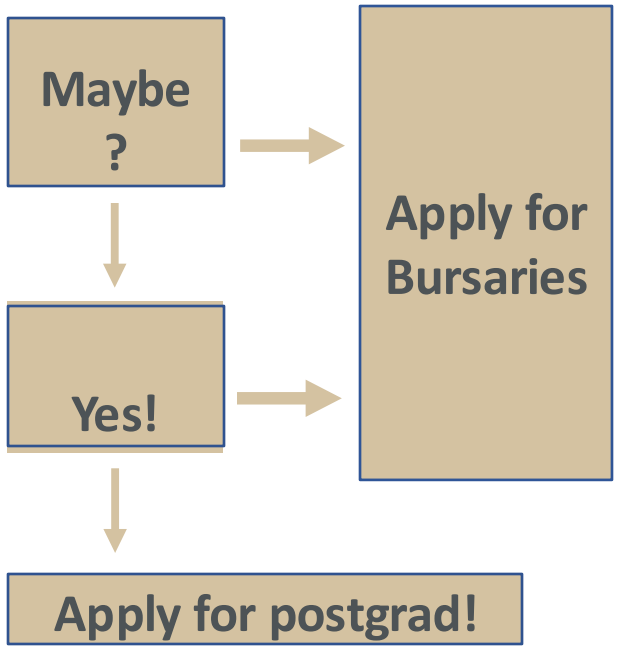
Division for PG Bursaries: postgradfunding@sun.ac.za

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

FAQ: What should I do next?

Even if you are unsure currently, do not miss the bursary application deadlines!



MSc/PhD: Make contact with academics to discuss projects

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

SAGWRI South African Grape and Wine Research Institute

Contacts:

Dr Philip Young (pryoung@sun.ac.za) :PG coordinator

Prof Melane Vivier (mav@sun.ac.za (Director: SAGWRI)

TikTok

Linkedin

Facebook

Instagram

X (Twitter)

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

SAGWRI

South African Grape and Wine
Research Institute

Thank you • Enkosi • Dankie