NWU®

Inaugural Lecture
Intreerede

Prof Rialet Pieters

Organic chemical pollutants and bio-assays: matrimony between chemistry and biology

Date/Datum: **20 August/Augustus 2021**	**Venue/Lokaal:** **Senate Hall/Senaatsaal** **Potchefstroom Campus/Kampus**
Time/Tyd: **17:30 for/vir 18:00**	

North-West University Anthem

Bokone Bophirima	North-West
Re kaêlê Morêna	Guide us oh Lord
Ka wêna re ka êma	With you we can stand firm
Ra tshwarana	And be united
Ao, Morêna	Oh Lord
O re gôgê	Please guide us
Leseding re gôrôgê	So we reach where light is.
Waar die wilgers welig spruit,	Where willows grow abundantly
Doringboom sy skadu sprei,	Where thorn trees spread their shade
Soos ons groei in kundigheid	As we grow in knowledge
Mag U ons lei	May You give us guidance
Seën ons, o Heer	Bless us, Lord,
Lei met U hand	Guide with Your hand
Laat U seën rus oor ons land	Grant Your blessings o'er our land.
Three strong streams united flow	Three strong streams united flow
Africa stands proud and tall	Africa stands proud and tall
As we learn, we trust, we know	As we learn, we trust, we know
God is in control	God is in control
Bless us, oh Lord	Bless us, oh Lord
Guide us with grace	Guide us with grace
May North-West be blessed always	May North-West be blessed always
Bless us, oh Lord	Bless us oh Lord
Seën ons, o Heer	Bless us oh Lord
O re tshegofatse	Bless us
Morena	Lord
Seën ons	Bless us
Bless us, oh Lord	Bless us oh Lord

Lyrics: Theriso Tsambo (Tswana) / Corneels Schabort (Afrikaans, English)
Music: Katlego Maboe, Michael de Villiers, Stefan Pretorius, Niekie van der Walt, Johan Venter
Arrangement: Christa Steyn

Programme

Academic Procession / Akademiese prosessie
University Anthem / Universiteitslied

Opening
Ms/Me Hannalie van Staden

Word of welcome / Verwelkoming
Prof Francois van der Westhuizen
Deputy Dean: Research and Innovation
Adjunk-dekaan: Navorsing en Innovasie

Introduction by / Bekendstelling deur
Prof David M. Modise
Executive Dean / Uitvoerende Dekaan

Inaugural lecture / Intreerede

Organic chemical pollutants and bio-assays: matrimony between chemistry and biology

Presentation of certificate and word of congratulation
Oorhandiging van sertifikaat en gelukwensing
Prof Jeffrey Mphahlele
Deputy Vice-Chancellor: Research and Innovation
Adjunk-visekanselier: Navorsing en Innovasie

Closing / Afsluiting
Prof Francois van der Westhuizen

National Anthem / Nasionale lied
Academic procession / Akademiese prosessie

Dinner / Aandete

BIOGRAPHY

Rialet, eldest of four children born to Koos and Hendrien Pieters, matriculated at Potchefstroom Gimnasium in 1986. She completed her BSc degree at the then Potchefstroom University for Christian Higher Education, obtained her teachers training diploma and completed an MSc in Zoology before a teaching stint at Kriel High School in Mpumalanga (1993–1995). She was appointed at Zoology here at her Alma Mater in 1996.

Since then she was involved in the training of undergraduate students, teaching chordate diversity and biology didactics, but mostly embryology, cytogenetics and evolution. Until 2019 there was extensive involvement in undergraduate training of UNISA students too (both distance and contact training). She has also been involved in training honours students since 1996. She had been awarded teaching excellence awards on three occasions.

Rialet was awarded a PhD in 2008 and became a C-rated National Research Foundation (NRF) scientist in 2016. She supervised five PhD students, 12 MSc students and there are a number who are currently enrolled and therefore still suffering. She was external examiner to 17 post-graduate students from other South African universities, is associate editor of two international Springer journals and acted as guest editor of a special issue of Journal of Toxicology. She has 96 conference contributions of which 57 were presented at international conferences.

She has co-authored 13 research reports which amounts to approximately R9.5 million over the years, not including nine other minor contracts and the R1.19 million NRF support. She has co-authored 31 peer-reviewed papers and one book chapter.

Rialet was manager of the Aquatic Ecosystem Health sub-program in the Unit for Environmental Sciences and Management at the NWU for five years and is the current subject chair of Zoology.

When she is not working, she likes to hike on nature trials or keeping her hands busy with paper crafts.

BIOGRAFIE

Rialet, die oudste van vier kinders wat vir Koos en Hendrien Pieters beskore was, het in 1986 aan die Potchefstroom Gimnasium matrikuleer. Sy voltooi haar BSc-graad aan die destydse Potchefstroomse Universiteit vir Christelike Hoër Onderwys, verkry haar onderwysdiploma en voltooi ’n MSc in Dierkunde, voordat sy vir ’n kort rukkie (1993–1995) by Hoërskool Kriel in Mpumalanga skoolhou. Sy is sedert 1996 by Dierkunde by haar Alma Mater aangestel.

Sedertdien was sy betrokke by die opleiding van voorgraadse studente waar sy chordaatdiversiteit en biologievakdidaktiek, maar meestal embriologie, sitogenetika en evolusie, aangebied het. Tot en met 2019 was sy ook uitgebreid betrokke by die voorgraadse opleiding van UNISA (beide afstand- en kontakgebaseerde opleiding). Sy was ook betrokke by die opleiding van honeurs-studente sedert 1996. Sy is by drie geleenthede met uitnemende onderrigtoekennings beloon.

’n PhD is in 2008 aan Rialet toegeken en in 2016 is sy as C-gegradeerde wetenskaplike deur die Nasionale Navorsingstigting (NNS) erken. Sy het studieleiding aan vyf PhD- en 12 MSc-studente verleen. Daar is nog ’n paar wat besig is met hulle studies en dus nog swaarkry. Sy was eksterne eksaminator vir 17 nagraadse studente van ander Suid-Afrikaanse studente, is sub-redakteur by twee internasionale Springerjoernale en was gasredakteur van ’n spesiale uitgawe van Journal of Toxicology. Sy het 96 kongresby-draes waarvan 57 by internasionale kongresse aangebied is.

Sy was mede-outeur van 13 navorsingsverslae wat ongeveer R9.5 miljoen oor die jare gegenereer het, uitgeslote nege ander kleiner kontrakte en NNS-ondersteuning ter waarde van R1.19 miljoen. Sy het 31 eweknie-geëvalueerde navorsingsartikels en een boekhoofstuk gepubliseer.

Rialet was bestuurder van die Akwatiese Ekostelselgesondheid-subprogram van die Eenheid vir Omgewingswetenskappe en -bestuur by die NWU vir vyf jaar en is tans die vakgroepvoorsitter van Dierkunde.

Wanneer sy nie werk nie, hou sy daarvan om staptogte te onderneem of om met papierhandwerk besig te wees.

ABSTRACT

Knowing the concentration of a pollutant in the environment, i.e. sediment, soil, water, and air, and comparing it to a guideline level to know whether it occurs at an 'acceptable' level, is not adequate anymore. Biota in the environment is exposed to a mixture of compounds, and even if the exposure does not lead to acute toxicity and immediate death of the organism, the combined effects of continuous exposure to low concentrations of many xenobiotics over a lifetime, may lead to detrimental health effects of both humans and other living organisms. Biota living in a polluted environment may present evidence of how the toxicants in their environment have harmed them, but by the time the effect of pollution is visible on organismal and population level, mitigation might be too late. This is where the application of *in vitro* bioassays become useful. Extracts from environmental matrices may be administered to tissue cultures to determine harmful effects timely. In my research, bio-assays are employed to specifically determine endocrine disruptive effects. These reporter gene-bioassays are semi-quantitative and although the precise identity of the pollutants are not known, the biological effect of the total mixture of pollutants are known. Based on the results from bio-assays, useful predictions and extrapolations can be drawn to improve management and protection of biota and human life.

ABSTRAK

Om vertroud te wees met die konsentrasie van ’n besoedelstof in die omgewing, naamlik in die sediment, grond, water en lug, en dit dan te vergelyk met ’n riglyn waarteen dit nog ‘aanvaarbaar’ is, is nie meer voldoende nie. Organismes in die omgewing word aan ’n verskeidenheid verbindings blootgestel, en selfs al sou die blootstelling daaraan nie lei tot akute toksisiteit en die onmiddellike dood van ’n organisme nie, mag die gesamentlike effek van ’n lewenslange volgehou blootstelling aan lae konsentrasies van baie verbindings, lei tot benadeling van die gesondheid van beide mens en lewende organismes. Biota wat reeds in die besoedelde omgewing leef mag bepaalde tekens bevat van hoe hulle deur die besoedelstowwe benadeel is, maar teen die tyd dat besoedeling ’n effek op die organisme of op bevolkingsvlak het, is dit dikwels te laat om iets aan die saak te doen. Dit is hier waar die toepassing van *in vitro* biosiftingstoetse nuttig aangewend kan word. Ekstrakte uit omgewingsmatrikse word aan weefselkulture toegedien om sodoende skadelike effekte betyds te kan vasstel. In my navorsing word biosiftingstoetse gebruik om spesifiek hormoonontwrigtende effekte na te speur. Nuttige voorspellings en afleiding kan gemaak word uit die resultate van die biosiftingstoetse om sodoende biota en die mens se gesondheid beter te bestuur en te beskerm.

National Anthem

Nkosi sikelel' iAfrika
Maluphakanyisw' uphondo lwayo,
Yizwa imithandazo yethu,
Nkosi sikelela, thina lusapho lwayo.

Morena boloka setjhaba sa heso,
O fedise dintwa le matshwenyeho,
O se boloke, O se boloke setjhaba sa heso,
Setjhaba sa South Afrika – South Afrika.

Uit die blou van onse hemel,
Uit die diepte van ons see,
Oor ons ewige gebergtes,
Waar die kranse antwoord gee,

Sounds the call to come together,
And united we shall stand,
Let us live and strive for freedom,
In South Africa our land.