

WOAH Collaborative Centre Reports Activities 2025

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CENTRE INFORMATION

*Title of WOA Collaborating Centre	Training in Integrated Livestock/Wildlife Health
*Address of WOA Collaborating Centre	100 Old Soutpan Road, Faculty of Veterinary Science; University of Pretoria, Paraclinical Building (1st floor; Room 2-31),
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*E-mail address:	anita.michel@up.ac.za
Website:	https://www.up.ac.za/woah-collaborating-centre
*Name Director of Institute (Responsible Official):	Prof. Vinny Naidoo
*Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Prof. Anita L Michel; Full Professor: Microbiology
*Name of the writer:	Anita Michel

TOR 1 AND 2: SERVICES PROVIDED

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Category	Title of activity	Scope
Disease control (true)	Transboundary Disease research	<p>Foot-and-mouth disease: A research study entitled 'Evidence-based risk reduction for FMD virus persistence at slaughter' has been conducted to investigate the conditions under which the "5th quarter" of slaughtered, FMD-infected bovines can be safely marketed. This study is expected to reform slaughter regulations. Brucellosis in African buffalo: A longitudinal research study to investigate the transmission of Brucella abortus among African buffalo is currently being conducted in an infected herd of farmed buffalo. Rabies: The production and testing of neutralising antibodies to certain strains of rabies virus in tobacco plants has been initiated to achieve a safer, effective and more economical rabies treatment.</p>
Training, capacity building (true)	Postgraduate research programmes	Our Collaborating Centre forms part of the research-intensive University of Pretoria and contributes to capacity building through postgraduate training in

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		livestock and wildlife health and management.
Wildlife (true)	Veterinary clinical and pathology services	<p>Our Collaborating Centre provides veterinary clinical and pathology services to private clients and wildlife conservation authorities in South Africa and other WOA member countries. The services cover a wide spectrum of mostly native wildlife species. 1. Breakdown of clinical wildlife cases: 1. Clinical examinations (# cases): 367, including Carnivores (lion, cheetah, leopard, wild dog, hyena, black-footed cat): 84 Birds: 87 White rhinoceros: 8 Antelopes: 11 Other (warthog, zebra, giraffe reptiles etc): 177 Non-human primates: 39 2. Wildlife medical innovations: The Onderstepoort Wildlife Clinic performed the first CT scan on a live adult rhino in South Africa. Prof Steenkamp and Prof Rordiffe led the first tusk extraction in an elephant under general anaesthesia in Cambodia. 3. Wildlife-human interface: A research study conducted in free-ranging hippopotami highlighted the spectrum of bacteria dominating their oral flora and causing reduced efficacy of antibiotic treatment in bite wound victims.</p>
Diagnosis, biotechnology and laboratory (true)	Diagnostic services	<p>Our Collaborating Centre encompasses microbiology laboratories which render diagnostic services to clients for testing of wildlife samples to assist with disease diagnosis and surveillance. Serology: wildlife: 4279; livestock: 14072 Bacteriology (buffalo, rhinoceros, antelopes, carnivores, non-human primates): 157 Clinical pathology: livestock: 1367; wildlife: 238 Helminthology: livestock: 178 Pathology: Wildlife: 62; livestock: 197</p>
Veterinary medicinal products (true)	Joint CPD and Postgraduate Programmes in veterinary medicine regulatory affairs	<p>In collaboration with the UK-Veterinary Medicines Directorate our Collaborating Centre has been developing a postgraduate programme in veterinary regulatory affairs to support skill enhancement and capacity building in the Sub-Saharan region with regard to veterinary regulation professionals.</p>

TOR 3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable Area

3. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

Yes

Research need 1

Please type the Research need: Recommendations for the safe translocation of wildlife

Relevance for WOAH Disease Control, Animal Welfare,

Relevance for the Code or Manual Manual,

Field Epidemiology and Surveillance, Diagnostics,

Animal Category Terrestrial,

Disease:

Kind of disease (Zoonosis, Transboundary diseases) Zoonosis, Transboundary diseases,

If any, please specify relevance for Codes or Manual, chapter and title

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

Answer:

Notes:

Answer:

4. Did your Collaborating Centre maintain a network with other WOA

H Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

Name of WOA	Location	Region of networking Centre	Purpose
Animal and Plant Health Agency	Weybridge, UK	Europa	Collaboration on investigating epidemiology of lyssaviruses in Chiropteran species.
ARC-Onderstepoort Veterinary Research	Onderstepoort, South Africa	África	Acting as Head of Rabies Reference Laboratoryence laboratory
University of Limoges	Limoges, France	Europa	Collaboration with colleagues, working on Toxoplasmosis.
WildNet	Paris, France	Europa	Member of the WildNet

TOR 4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOA

H Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of WOA	Region of networking
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	Location	Centre	Purpose
Southern African Wildlife College	Hoedspruit, South Africa	Africa	Training of Professional herders and herd team leaders at the livestock-wildlife interface to reduce wildlife-human conflict and capacity building in disease control.
Oregon State University	Corvallis, Oregon	Americas	Detection of <i>A. marginale</i> and <i>A. centrale</i> in buffalo in the Kruger National Park. Part of NSF-NIH-NIFA Ecology and Evolution of Infectious Disease award 2208087 "Multi-scale infection dynamics from cells to landscapes: FMD in African buffalo" awarded to Anna Jolles
Washington State University	Pullman, Washington	Americas	Examination of <i>Anaplasma</i> species in rodents, impala, cattle and domestic dogs from the Kruger National Park and at a human-livestock-wildlife interface of the Mnsi community.
Institute of Veterinary Pathobiology, National Institute of Agricultural Technology	Argentina	Americas	Scientific collaboration on bovine theileriosis
Freie University Berlin	Germany	Europe	Scientific collaboration on bovine theileriosis
ILRI	Nairobi, Kenya	Africa	Scientific collaboration on bovine theileriosis
Central Veterinary Institute Zambia	Lusaka, Zambia	Africa	Scientific collaboration on bovine theileriosis
Cornell University	Cornell, New York, USA	Americas	Provide expert advice on management of foot-and-mouth disease at the wild-domestic interface in southern Africa

TOR 6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOA?H?

Yes

Name of expert	Kind of consultancy	Subject
Mary-Lou Penrith Anita Michel	Ad hoc Working group member Review of Chapter 1.1.2 of the Terrestrial Manual V2013	Risk Management Practices at the Domestic Wild Animal Interface

TOR 7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

Services in wildlife health management and wildlife pathology were provided to multiple wildlife rehabilitation centres and conservation authorities in South Africa

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOA, to personnel from WOA Members?

Yes

a) Technical visit : 0

b) Seminars : 2

c) Hands-on training courses: 4

d) Internships (>1 month) : 0

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
C	Specialised training in veterinary ectoparasitology and primary animal health care	Malawi, Zimbabwe, South Sudan, Nigeria, Zambia, South Africa, Kenya, Tanzania, Ethiopia, Botswana, Mozambique	11
C	Buffalo TB Testing course	Namibia, South Africa	28
C	Tick identification course	Italy, the Netherlands, Mozambique, Zambia, Botswana, Tanzania, Kenya, Ethiopia, South Sudan, Zimbabwe, Malawi, Nigeria, South Africa	17
C	Bioinformatics workshop	South Africa	12
B	Veterinary Medicine in International Development short course: Provided lecture on Balancing Animal Disease Control and Preserving Livelihoods: The example of African swine fever in resource-limited settings	USA and Puerto Rico	20
B	Joint GARA-WOAH Webinar on the WOA Guidelines for ASF vaccines, field evaluation and post-vaccination monitoring	International	50

TOR 8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOA?H

No

TOR 9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOA?H that may be useful to Members of WOA?H

a) Articles published in peer-reviewed journals:

22

1. Ackermann RE, Gall CA, Brayton KA, Collins NE, van Wyk I, Wentzel J, Kolo AO, Oosthuizen MC (2025). Temporal changes in the bacterial microbiome of the salivary gland and midgut tissues of *Rhipicephalus sanguineus* (s.l.) ticks in South Africa. *Scientific Reports* 15(1): 17434. doi: 10.1038/s41598-025-99189-0.
2. Kolo AO, Brayton KA, Collins NE, Bastos ADS, Matthee S, Gall CA, Wentzel J, Neves L, Oosthuizen MC (2025). Bacterial blood microbiome of *Mastomys* rodents: implications for disease spill-over at the animal-human interface within the Bushbuckridge-East community, South Africa. *Frontiers in Cellular and Infection Microbiology* 15: 1520086. <https://doi.org/10.3389/fcimb.2025.1520086>
3. Seroprevalence of *Neospora caninum* in dairy goats from northern South Africa: A preliminary study
WM Tagwireyi, GA Garcia, D Morar-Leather, L Neves, PN Thompson. *Veterinary Parasitology: Regional Studies and Reports* 58, 101213
4. Ehrlichia ruminantium (Ehrlichia) infection rates and genotyping in *Amblyomma* species from southern Africa
Andeliza Smit a, Fernando C. Mulandane b, Stephane H. Wójcik a, Choolwe Malabwa c, Gourgelia Sili d, Stephen Mandara e, Kaïssa Plaisir Pineau f g, Sylvie Lecollinet f g, Antoni Exbrayat g, Valérie Rodrigues f g, Hannah Rose Vineer h, Zinathi Dlamkile a, Wilhelm H. Stoltz a, Damien F. Meyer f g, Darshana Morar-Leather a, Benjamin L. Makepeace h, Luis Neves
5. Osofsky, S.A., Atkinson, S.J., Ramsden, N., Penrith, M.-L. 2025. Two decades of One Health in action: enabling sustainable wildlife conservation and livestock production in southern Africa. *CABI One Health*, 4:1, 0006.
6. Motlatso T. Hlokwé, Nomawethu S. Masina, Boitumelo Letsoko, Sewellyn C. Davey, Anita L. Michel. 2025. Are there benefits of culture-based detection of *Mycobacterium avium* spp paratuberculosis over histopathology? *Onderstepoort Journal of Veterinary Research* | Vol 92, No 1 | a2159 | DOI: <https://doi.org/10.4102/ojvr.v92i1.2159>
7. Zijie Zhou, Anouk van Hooij, J. Hessel M. van Dijk, Nina Musch, Louise Pierneef, Hamza Khalid, Kees Franken, Thomas Holder, Neil Watt, Anita L. Michel, Jeroen D.C. Codée, Martin Vordermeier, Paul L.A.M. Corstjens, Elisabeth M.D.L. van der Heijden, Jayne C. Hope, Annemieke Geluk. 2025. Anti-phenolic glycolipid antibodies in *Mycobacterium bovis* infected cattle. *One Health*, Volume 20, 100982, ISSN 2352-7714, <https://doi.org/10.1016/j.onehlt.2025.100982>. (<https://www.sciencedirect.com/science/article/pii/S2352771425000187>)
8. Alfred Tlotlo Kgasi- Anita Luise Michel. 2025. Knowledge, attitude and practices assessment of control measures for bovine tuberculosis and brucellosis towards a more effective approach to national control programs in South Africa. *Tropical Animal Health and Production* (2025) 57:15. <https://doi.org/10.1007/s11250-024-04274-7>
9. Michel, A.L., Engelbrecht, M., Roux, F. et al. 2025. Antibiotic resistance profiles of oral flora in hippopotami (*Hippopotamus amphibius*): implications for treatment of human bite wound infections. *One Health Outlook* 7, 26 (2025). <https://doi.org/10.1186/s42522-025-00146-8>
10. Oscar Madzingira^{1*}, Emmanuel Hikufe Hikufe², Charles Byaruhanga³, Michael Sinvula Lukubwe⁴, Simbarashe Chinyoka¹, Evelyn Nanjeke Mwenda¹, and Esther Mariana Muradzikwa. Epidemiology of wild animal rabies in Namibia from 2001 to 2019: implications for controlling the infection in domestic animals. <https://doi.org/10.1186/s12917-025-04692-1>
11. Miemie Grobler a b, Geoffrey T. Fosgate a, Robert Swanepoel b, Jan E. Crafford. A Bayesian latent class estimation of the diagnostic accuracy of clinical examination and laboratory assays to identify bovine ephemeral fever virus infection in South African cattle. <https://doi.org/10.1016/j.prevetmed.2025.106475>
12. Ruth Omani 1,2,* , Folorunso O. Fasina 3,4, Peter Kimeli 5 and Nicolas Antoine-Moussiaux. Application of Behavior Change Techniques (BCTV1) to Reduce Antimicrobial Use in Livestock: A Scoping Review. *Vet. Sci.* 2025, 12(2), 172; <https://doi.org/10.3390/vetsci12020172>
13. Emmanuel P. Lita 1,2,3*, Ernatus M. Mkupasi¹, Erneo B. Ochi², Gerald Misinzo^{3,4}, Henriette van Heerden⁵, Robab Katani^{6,7}, Jacques Godfroid⁸ & Coletha Mathew. Molecular evidence of *Brucella abortus* circulating in cattle, goats, and humans in Central Equatoria State, South Sudan. <https://doi.org/10.1038/s41598-025-87368-y>
14. Natalie Viljoen 1,2, Claude Sabeta 3, Wanda Markotter 1 and Jacqueline Weyer. Temporal and Spatial Analysis of Rabies Virus Lineages in South Africa. *Viruses* 2025, 17(3), 340; <https://doi.org/10.3390/v17030340>
15. Whatmore Munetsi Tagwireyi a b, Gema Alvarez Garcia c, Darshana Morar-Leather a, Luis Neves a d, Peter N. Thompson. Seroprevalence of *Neospora caninum* in dairy goats from northern South Africa: A preliminary study. Volume 58, February 2025, 101213 <https://doi.org/10.1016/j.vprsr.2025.101213>
16. Andeliza Smit a,**, Fernando C. Mulandane b, Stephane H. Wójcik a, Choolwe Malabwa et al. Ehrlichia ruminantium (Ehrlichia) infection rates and genotyping in *Amblyomma* species from southern Africa. <https://doi.org/10.1016/j.ttbdis.2025.102462>
17. Lourens de Villiers^{1,2}, Johan P. Schoeman³, Barend L. Penzhorn et al. Prevalence, diagnostic evaluation, and disease associations of vector-borne pathogens in domestic dogs across Namibia: a multi-modal approach.
18. Sophy Nukeri a,b,* , Mokgadi Pulane Malatji a, Msawenkosi I. Sithole a, Philile I. Ngcamphalala a, Ignorie Nyagura a, Danisile Tembe a, Innocent Siyanda Ndlovu a, Mamohale Chaisi a,b,c, Samson Mukaratinwa. Infection rates of *Fasciola* spp. in cattle slaughtered at 13 abattoirs in six of nine provinces of South Africa. *Food and Waterborne Parasitology* <https://doi.org/10.1016/j.fawpar.2025.e00260>
19. Alischa Henning¹ · Lieza Odendaal¹ · Angelika Loots² · Melvyn Quan. Demonstrating persistence of foot-and-mouth disease virus in African buffalo (*Syncerus caffer*)

using BaseScope™ in situ hybridisation. *Veterinary Research Communications* <https://doi.org/10.1007/s11259-025-10898-3>

20. M. Nesane a,b,* , A. Pretorius a,b , W. van Wyngaardt a , S.I. Tshilwane b , F.E. Faber a , H. Steyn a,Y. Lemmer c , M. van Kleef a,b , N. Thema. In vitro characterization of the *E. ruminantium* pLAMP multi-epitope DNA poly (lactic-co-glycolic acid) nanoparticle vaccine in sheep peripheral blood mononuclear cells. *Veterinary Immunology and Immunopathology* <https://doi.org/10.1016/j.vetimm.2025.110977>

21. "Karen H. Keddy 1 , * , Sandra Hoffmann2 , Luria Leslie Founou 3,4,5 , , Teresa Estrada-Garcia6 , Tesfaye Gobena 7 , , Arie H. Havelaar8 , , Lea Sletting Jakobsen 9 , , Kunihiro Kubota 10 , Charlee Law 11 , 11 , Rob Lake 12 , Yuki Minato 11 , Fadi Nasr Radwan Al-Natour 13 , Sara M. Pires 9 , Tety Rachmawati 14 , Banchob Sripa 15 , Paul Torgerson 16 , Elaine Scallan Walter. Quantifying national burdens of foodborne disease—Four imperatives for global impact. *PLOS Global Public Health* <https://doi.org/10.1371/journal.pgph.0004309>

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b) International conferences:

2

1. 30th International Conference of the World Association for the Advancement of Veterinary Parasitology in Curitiba, Brazil. 17-21 August 2025. Poster title: Sekgobela, N., Troskie, M., Hassim, A., Neves, L., Bhoora, R.V. Development of a multiplex quantitative PCR assay for detecting *Theileria bicornis* and *Babesia bicornis* in rhinoceroses.

2. Brucellosis in South Africa: Challenges in diagnosis, transmission and control. Presented at the International Brucellosis Conference in Costa Rica

c) National conferences:

10

1. Bezuidenhout B, Ackermann RE, Goodman LB, Brayton KA, Oosthuizen MC, Fagir DM, Collins NE (2025). Assessment of quantitative real-time PCR assays to detect a novel *Anaplasma* species in dogs. Poster presentation at the Joint 5th International Congress on Parasites of Wildlife (ICPOW) and 53rd Annual Conference of the Parasitological Society of Southern Africa (PARSA), Skukuza, Kruger National Park, South Africa, 14 – 18 September 2025.

2. Aphane KA, Brayton KA, Mattos EC, Fagir DM, Oosthuizen MC, Makgabo SM, Collins NE (2025). Development of a method to extract high molecular weight DNA from a putative novel *Anaplasma* species identified in impala (*Aepyceros melampus*). Oral presentation at the Joint 5th International Congress on Parasites of Wildlife (ICPOW) and 53rd Annual Conference of the Parasitological Society of Southern Africa (PARSA), Skukuza, Kruger National Park, South Africa, 14 – 18 September 2025.

3. Duarte M, Brayton KA, Oosthuizen MC, Beechler B, Jolles AE, Makgabo SM, Collins NE (2025). Prevalence of *Anaplasma marginale* and *A. centrale* in African buffalo (*Syncerus caffer*) in the Kruger National Park and characterization of *A. marginale* strains. Oral presentation at the Joint 5th International Congress on Parasites of Wildlife (ICPOW) and 53rd Annual Conference of the Parasitological Society of Southern Africa (PARSA), Skukuza, Kruger National Park, South Africa, 14 – 18 September 2025 (Winner of the best First Time Presenter Award).

4. Nel M, Makgabo SM, Brayton KA, Ackermann RE, Oosthuizen MC, Collins NE (2025). Occurrence of *Anaplasma marginale* in cattle from villages in the Mnisi Community, Mpumalanga province, South Africa. Poster presentation at the Joint 5th International Congress on Parasites of Wildlife (ICPOW) and 53rd Annual Conference of the Parasitological Society of Southern Africa (PARSA), Skukuza, Kruger National Park, South Africa, 14 – 18 September 2025.

5. Fagir DM, Collins NE, Makgabo SM, Ueckermann E, Smith AT, Oosthuizen MC, Matthee S (2025). Ectoparasite diversity and distribution in *Rattus rattus* and *Rattus tanezumi* from rural communities in the Savanna biome, South Africa. Poster presentation at the Joint 5th International Congress on Parasites of Wildlife (ICPOW) and 53rd Annual Conference of the Parasitological Society of Southern Africa (PARSA), Skukuza, Kruger National Park, South Africa, 14 – 18 September 2025.

6. Oral presentation: Unravelling the evolution of *Amblyomma*: The case of *Amblyomma splendidum*

Presenter: Aneliza Smit - Co-authors: Annemike Bronkhorst, Darshana Morar-Leather, Luis Neves

7. Poster: Diversity of *Sarcocystis* in wildlife from the Greater Kruger, South Africa

Presenter: ON Sekujika – Co-authors: K Desai, M de Bruin, EP Mitchell, L de Klerk-Lorist, P Dorny, L Neves, D Morar-Leather

8. Danélle VENTER, Peter THOMPSON, Anita Luise MICHEL. Prevalence of bovine TB in rural Northern KZN. Poster presented at the 22nd Southern African Society for Veterinary Epidemiology and Preventive Medicine Congress, 20 – 22 August 2025, White River, South Africa.

9. Effort Maguta, I Jaja, A.L. Michel. Bovine tuberculosis knowledge, attitude and practice of cattle farmers in the Eastern Cape province, South Africa. Poster presented at the 22nd Southern African Society for Veterinary Epidemiology and Preventive Medicine Congress, 20 – 22 August 2025, White River, South Africa.

10. Michel, A.L. et al. Experiences from a 5-year brucellosis study in farmed buffalo. Oral presentation at the 22nd Southern African Society for Veterinary Epidemiology and Preventive Medicine Congress, 20 – 22 August 2025, White River, South Africa.

d) Other (Provide website address or link to appropriate information):

6

Popular article in Agriorbit: <https://agriorbit.com/fmd-outbreak-why-human-health-is-not-in-danger/>

FMD outbreak: Why human health is not in danger

PhD thesis:

S. Marcus Makgabo graduated in May 2024 with a Ph.D. (thesis entitled "Genetic diversity of *Anaplasma marginale* in cattle and in putative novel *Anaplasma* species from

wildlife in Mpumalanga, South Africa")

MSc theses:

1. MSc (Ms Madeli de Bruin) "Eco-epidemiology and genetic characterisation of *Toxoplasma gondii* in wildlife landscapes in the Greater Kruger, South Africa"
2. MSc (Dr Shanzelle Rabe) "Toxoplasma gondii infection in impala (*Aepyceros melampus*) from the Timbavati abattoir"
3. MScGOH (Mr Yechale Mebratie) Farmer's Risk Perception, Seroprevalence, and Associated Risk Factors of *Toxoplasma gondii* in Small Ruminants and Backyard Chickens in Selected Districts of West Gojjam Zone, Northwest Ethiopia

Podcast:
Understanding the global importance of pigs and why we need transdisciplinary research to resolve some of the challenges, Swine it Podcast Show, Canada, 10 November 2025

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

12. Additional comments regarding your report: