

# **WITS RESEARCH INSTITUTE FOR MALARIA NEWSLETTER**



**2023 | Issue 4**

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# DIRECTORS' MESSAGE

It is with great pride that we report back on our many achievements in 2022/2023. WRIM successfully hosted its first Research and Postgraduate Day in April 2022, showcasing our research diversity and excellence.

Congratulations to all our presenters on their excellent presentations and exciting areas of research. WRIM continues with its high publication output, awards and graduations.

Welcome to all our new students and staff who have joined our dynamic team – good luck with your research endeavours and keep us all in the loop with your latest findings.

To ensure we stay connected to foster collaborations and provide support to each other, WRIM will again host a Research and Postgraduate Day on **Thursday 9<sup>th</sup> of November 2023** in the Len Miller Auditorium, Faculty of Health Sciences Building. Please keep this date open to join us and share your research. More details will be sent out in due course.

A big thanks to Nerissa Bloch, Dr Chia-yu Chen, Mbuyi Kalonji and Priyanka Agarwal who contributed to this newsletter. We appreciate your enthusiasm and taking time out of your busy schedules to assist us.

As Directors of WRIM, we wish you all the best with your research and collaborations, and may 2023 continue to be a year in which we all shine and again make a positive contribution towards the knowledge base vital to reduce malaria transmission.



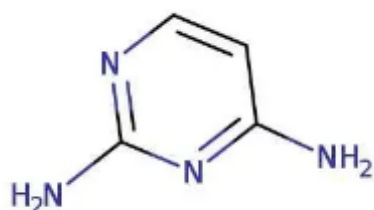
# WRIM RESEARCH HIGHLIGHTS

In 2022, WRIM published **43 articles** in prestigious journals including *Science Translational Medicine*; *Lancet*, *Pathogens*, etc. In the combined fields of Entomology, Parasitology and Tropical Medicine, the top 25% of journals have impact factors (IF) above 2.00. In Pharmacology and Pharmacy, it is 3.3 and above. A full list of publications is available on the website: <https://www.wits.ac.za/wrim/publications/>.



**Niain'ny Felamboahangy, L., Kaiser, M. L., Zengenene, M. P., Okumu, F., Munhenga, G., & Koekemoer, L. L.** 2023. Optimisation of laboratory-rearing parameters for *Anopheles funestus* larvae and adults. *Acta Tropica*, 238, 106785. <https://doi.org/10.1016/j.actatropica.2022.106785>:

*Anopheles funestus* females can produce viable eggs if fed on defibrinated bovine blood and can be used as an alternative adult blood-feeding system. Optimal larval rearing parameters can be used as standard operating procedures for this species.



**Somandi, K., Seanego, T.D., Dlamini, T., Maree, M., de Koning, C.B., Vanichtanankul, J., Rattanajak, R., Saeyang, T., Yuthavong, Y., Kamchonwongpaisan, S. and Rousseau, A.L.,** 2022. Molecular Docking Studies, Synthesis and Biological Evaluation of Substituted Pyrimidine-2, 4-diamines as Inhibitors of *Plasmodium falciparum* Dihydrofolate Reductase. *ChemMedChem*, 17(22), p.e202200418. <https://doi.org/10.1002/cmdc.202200418>

A series of pyrimidine-2,4-diamines were assessed *in silico* as potential inhibitors of *Plasmodium falciparum* dihydrofolate reductase, synthesised and tested for inhibitory activity against *PfDHFR in vitro*. The compounds displayed inhibitory activity in the nanomolar range against both wild-type and quadruple mutant *PfDHFR* in the biochemical enzyme assay, but were less potent in the whole-cell *P. falciparum* assay.



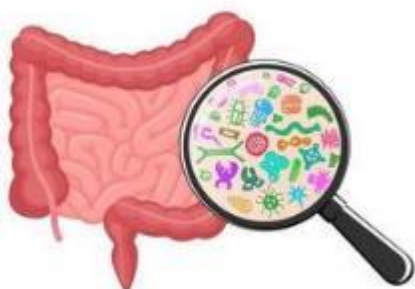
**Ntoyi, N.L., Mashatola, T., Bouyer, J., Kraupa, C., Maiga, H., Mamai, W., Bimbile-Somda, N.S., Wallner, T., Carvalho, D.O., Munhenga, G. & Yamada, H.,** 2022. Life-history traits of a fluorescent *Anopheles arabiensis* genetic sexing strain introgressed into South African genomic background. *Malaria Journal*, 21, 254. <https://doi.org/10.1186/s12936-022-04276-6>

South African SIT project increases its sex separation strategy tool box.



**Markus, M.B.** 2022. How does primaquine prevent *Plasmodium vivax* malarial recurrences? *Trends in Parasitology* 38: 924-925. <https://doi.org/10.1016/j.pt.2022.09.006>

Current dogma is that primaquine prevents *Plasmodium vivax* malarial recurrences mainly by killing hypnozoites and pre-erythrocytic hepatic schizonts. But it might also inactivate non-circulating asexual stages.



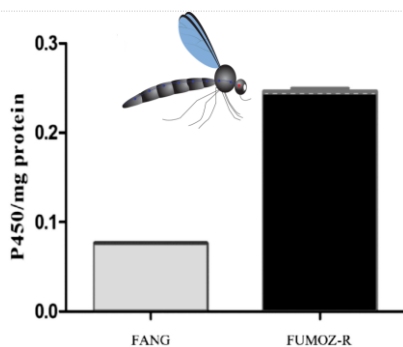
**Singh, A.,** Allam, M., Kwenda, S., Khumalo, Z.T., Ismail, A. and Oliver, S.V., 2022. The dynamic gut microbiota of zoophilic members of the *Anopheles gambiae* complex (Diptera: Culicidae). *Scientific Reports*, 12(1), p.1495. <https://doi.org/10.1038/s41598-022-05437-y>

Gut microbiota is a critical determinant of mosquito life history. In this MS, we describe the dynamic gut microbiota of members of the *An. gambiae* complex and speculate on their role in vector competence.



**Munhenga, G.,** Oliver, S.V., Lobb, L.N., Mazarire, T.T., Sekgele, W., Mashatola, T., Mabaso, N., Dlamini, D.M., Zulu, M., Molestane, F., Letinic, B.D., Zawada, J., Burke, A., Dahan-Moss, Y., Matamba, A., Kaiser, M., Brooke, B.D., 2022. Malaria risk and receptivity: Continuing development of insecticide resistance in the major malaria vector *Anopheles arabiensis* in northern KwaZulu-Natal, South Africa. *South Afr. J. Sci.* 118, 1–7. <https://doi.org/10.17159/sajs.2022/11755>






Insecticide resistance in the major malaria vector *Anopheles arabiensis* in northern KwaZulu-Natal Province is cause for concern in terms of resistance management and ongoing vector control leading toward malaria elimination. Despite ongoing control interventions, northern KwaZulu-Natal remains receptive to malaria owing to the perennial presence of several *Anopheles* vector species






**Thankhoe A.** Rants'o, Lizette L. Koekemoer, Robyn L. van Zyl (2023). The insecticidal activity of essential oil constituents against pyrethroid-resistant *Anopheles funestus* (Diptera: Culicidae). *Parasitology International*, 2023;95: 102749.

*Anopheles* resistance is a major drawback in the application of insecticides in malaria vector control programs. This work identified essential oil constituents with potential to kill *Anopheles* vectors that are resistant to current insecticides including pyrethroids.

# AWARDS AND ACHIEVEMENTS

<p><b>Prof. Basil Brooke</b></p> 	<ul style="list-style-type: none"> <li>-Appointed to the Elimination 8 vector control technical advisory group, and chairperson for the period 2021–2022</li> <li>-Appointed Managing Editor of the Public Health Bulletin of South Africa (PHBSA)</li> </ul>
<p><b>Dr. Chia-Yu Chen</b></p> 	<ul style="list-style-type: none"> <li>- Awarded NRF Innovation Postdoctoral Fellowship (2023-2025)</li> <li>-Awarded Carnegie Post-Doctoral Fellows Grant (2023-2024)</li> </ul>
<p><b>Prof Immo Kleinschmidt</b></p> 	<ul style="list-style-type: none"> <li>-Temporary member, WHO Vector Control Advisory Group</li> <li>-Member of WHO <i>Wolbachia</i> Evidence Review Group</li> <li>-Re-appointed Malaria Expert to the SADC Malaria Elimination 8 Secretariat</li> <li>-Appointed Chair of DSMB to BITE study</li> </ul>
<p><b>Prof. Lizette Koekemoer</b></p> 	<ul style="list-style-type: none"> <li>-Regional and Technical Adviser (Southern Africa) for Sustainable Vector Control Solutions Ltd (2021– )</li> </ul>
<p><b>Dr Jaishree Raman</b></p> 	<ul style="list-style-type: none"> <li>-Reappointed as a member of Elimination 8 diagnosis and case management technical working group (2023–2024)</li> <li>-Appointed as a member of Steering Committee for the Innovation Equity Forum of the National Institutes of Health Initiative to map global opportunities to advance women's health equity (2023)</li> <li>-Appointed to Project Technical Oversight Committee of the Tanzanian Malaria Molecular Project (2021–2023)</li> </ul>



<p><b>Dr. Givemore Munhenga</b></p> 	<p>-The article by Munhenga, G., Oliver, S.V., Lobb, L.N., Mazarire, T.T., Sekgele, W., Mashatola, T., Mabaso, N., Dlamini, D.M., Zulu, M., Molestane, F., Letinic, B.D., Zawada, J., Burke, A., Dahan-Moss, Y., Matamba, A., Kaiser, M., Brooke, B.D., 2022. Malaria risk and receptivity: Continuing development of insecticide resistance in the major malaria vector <i>Anopheles arabiensis</i> in northern KwaZulu-Natal, South Africa. South Afr. J. Sci. 118, 1–7. <a href="https://doi.org/10.17159/sajs.2022/11755">https://doi.org/10.17159/sajs.2022/11755</a> won the SAJS Outstanding Article Award for 2022</p> <p>- Nominated for the 2021/2022 NSTF-South32 Awards in April 2022</p> <p>- Secured funding (ZAR1.5M) from Department of Science and Innovation to complete Sterile Male Releases and data analysis (November 2022)</p> <p>- Invited at the Abdus Salam International Centre for Theoretical Physics to give a talk during the Joint ICTP-IAEA Workshop on Accounting for Climate in Vector-borne Disease Intervention Planning Including the Sterile Insect Technique (SIT) from 22 May 2023 to 26 May 2023</p> <p>-Appointment as chair to lead investigation of transition from gamma to X-ray source for the South African SIT programmes was extended to December 2023</p> <p>-Released the first sterile males in KwaZulu-Natal as part of the development of the protocol for future pilot SIT releases – releases ended in December 2022.</p>
<p><b>Dr Shüné Oliver</b></p> 	<p>-Awarded Female Academic Leaders Fellowship (FALF) fellowship</p> <p>- Awarded Self-initiated Research Grant from the Medical Research Council of South Africa</p> <p>- Awarded NRF Y-rated researchers funding</p> <p>- Awarded NRF competitive support for rated researchers</p>
<p><b>Mr. Polius Pinda</b></p> 	<p>-Received the W Harding Le Riche Medal in Epidemiology at the Faculty of Health Sciences Prize-Giving ceremony” 2nd May 2023. MSc-degree in epidemiology.</p>



## 2022 MSC GRADUATIONS



**Sinalo Gqunu:**  
Population dynamics of  
the malaria vector  
*Anopheles arabiensis*  
from northern KwaZulu  
Natal, South Africa  
(2014-2019)

**Supervisors:** Prof.  
Givemore Munhenga and  
Dr. Innocent Maposa



**Miriam Mwamba  
(Distinction):**  
Blood-meal identification  
and impact of blood  
feeding on female-  
specific esterase in the  
*Anopheles funestus*  
group

**Supervisors:** Prof.  
Lizette Koekemoer and  
Dr. Yael Dahan-Moss



**Polius Pinda:**  
The influence of age and  
distance from aquatic  
habitats on the pyrethroid  
resistance phenotypes of  
*Anopheles funestus*  
mosquitoes in south-  
eastern Tanzania

**Supervisors:** Prof. Lizette  
Koekemoer and Dr. Fredros  
Okumu



**Witness Ramashia:**  
Transcription analysis of  
an immune factor in a  
main African malaria  
vector *Anopheles  
funestus*

**Supervisors:** Prof.  
Lizette Koekemoer and  
Prof. Rob yn Van Zyl

## 2023 PHD GRADUATION



**Thankhoe Rants'o:**  
*In vitro* and *in silico* characterization of the anticholinesterase activity of  
select terpenoids against *Anopheles* vectors.

**Supervisors:** Prof. Robyn van Zyl, Prof. Lizette Koekemoer, and Dr.  
Jenny-Lee Panayides.

# NEW WRIM MEMBERS

*We would like to give a warm welcome to  
the new members that have joined WRIM  
during 2022/2023!*

## STAFF

**Dr. Chia-Yu Chen**



**Discipline:** Postdoctoral Research Fellow (Medical Entomology, Vector Control)

**Fun fact:** I love karaoke and video games.

**Dr Sarentha Chetty**



**Discipline:** Pharmacy & Pharmacology

**Fun fact:** "Life is so much better with good music and when you are surrounded by nature...."

## PHD STUDENTS

**Emmanuel Elirehema Hape**



**Discipline:** PhD Student (Enthusiast of Molecular biology and Entomology)

**Fun fact:** Firmly committed to the beliefs that the most appropriate way to answer "real world" problems are through basic research and that these answers should be communicated in a professional manner to those audiences who can benefit most from them.



**Edward Edmond Makhulu**



**Discipline:** PhD in Microbiology and molecular biology

**Fun fact:** I am an avid lover of anything arts related. I was a director of my drama club during my bachelor's, I take a keen interest in pencil drawing, and I have authored a science fiction novel (unpublished) in Swahili. I believe my love for science has really improved my creativity in the arts-related hobbies I indulge in.

## MSC STUDENTS

**Shristi Misser**



**Discipline:** Vector Control, Master of Science in Medicine by Research.

**Fun fact:** I love all things spooky and true crime.

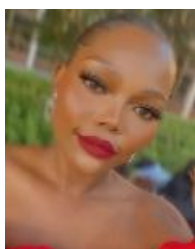
**Wendy Rasikhanya**



**Discipline:** Vector Control, Master of Science in Medicine by Research

**Fun fact:** I love writing and have authored a short story collection titled "In My Mind's Sight" at the age of 19.

**Faith Chihanba**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** Dakota Fanning and I were born on the same day, the same year.

**Fungai Maburutse**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** 'I believe age is just but a number if one has the willingness and the correct attitude to learn'

**Lauren Dennis**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** I have a devastatingly keen sense of smell and it is as much of a burden as you would think be.



**Unathi Chiliza**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** I have an uncanny ability to predict the outcome of rock paper scissors. My peers often marvel at my intuition, as I consistently manage to select the winning move. It's almost as if I have a sixth sense.

**Suné Malan**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** In 2015, I was part of the South Africa Dance team for ballet that took part in the Dance World Cup in Romania.

**Venisha Govender**



**Discipline:** Clinical and Experimental Pharmacology

**Fun fact:** I like to read.



# HONOUR STUDENTS

**Natasha Killassy**



**Discipline:** Molecular Medicine

**Fun fact:** I am a huge fantasy nerd: Harry Potter, Lord of the Rings, The Hunger Games or Star Wars – I love it all!

**Safeera Sabjee**



**Discipline:** Molecular Medicine

**Fun fact:** I lived in Saudi Arabia for two years and attended MEIS. The highlights were getting caught up in major sandstorm and having the traditional weekend replaced with Thursdays and Fridays.

**Beate Malan**



**Discipline:** Pharmacology (Bioscience)

**Fun fact:** I was a Junior South African Gymnast.

**Jenna Busscher**



**Discipline:** Pharmacology

**Fun fact:** I have a black belt in karate.

**Taylya Grant**



**Discipline:** Pharmacology

**Fun fact:** I love horses.



**Samishka Moodley**



**Discipline:** Pharmacology

**Fun fact:** I thoroughly enjoy dancing.

**Ramaphoko Lillian**



**Discipline:** Pharmacology

**Fun fact:** One thing I'm particularly proud of is showing up and trying my best every day.

**Nevisha Moodley**



**Discipline:** Molecular Medicine

**Fun fact:** Ironically...I have a slight phobia of cockroaches.



# PAST EVENTS

## THE VERY FIRST WRIM RESEARCH DAY 2022!

For the first time, WRIM hosted a research day to celebrate all the research across the Institute. This was held on the 20<sup>th</sup> of April 2022 as part of World Malaria Day events. A team of staff and students contributed towards making this a fantastic day. Special thanks to the companies shown below who sponsored the presentation prize. CONGRATULATIONS to all the winners! You can find more details on the WRIM website.



## 2<sup>nd</sup> WRIM RESEARCH DAY - 2023

WRIM proposes to host the 2nd research day on the **9<sup>th</sup> of November 2023** in the Len Miller Auditorium, WITS Faculty of Health Sciences Building - so please keep this date open!





# WORLD MALARIA DAY 2023

This wonderful and interactive event was held at the PRF, National Institute of Communicable Diseases, Sandringham, on 25 April 2023. It was a huge success and lots of fun and learning were had by all. A total of 146 people attended, all of whom raved about the event. The day consisted of three stations: vector and epidemiology, the parasite and life cycle, and case management and diagnosis. The stations consisted of videos, microscopes, games and posters. To commemorate this day, posters were displayed at WITS Medical School as well.



# YEBO GOGGA EXHIBITION 2023

Yebo Gogga was held at WITS Main Campus from 17 to 21 May 2023. The team from Yebo Gogga Yebo amaBlomo explored how plants and animals 'beat the heat' and how heat impacts science and society. It was enjoyed by young and old, and was a huge success. Thanks to our organisers and volunteers who gave up their time in helping us make it a great few days!





# INTERNATIONAL DAYS

**World Health Day - April 7<sup>th</sup> of every year:** While not specifically related to entomology and malaria, World Health Day is an international observance to raise awareness about global health issues and highlight the work of health organizations around the world, including those involved in the fight against malaria and other vector-borne diseases (<https://www.un.org/en/observances/list-days-weeks>).

**World Malaria Day - April 25<sup>th</sup> of every year:** This day is observed to raise awareness about the global burden of malaria and the need for continued investment and political commitment to the fight against the disease (<https://www.who.int/campaigns/world-malaria-day/2023>).

**Insect Repellent Awareness Day, United States – June 3<sup>rd</sup>:** On this day, organizations and individuals are encouraged to educate the public about the importance of using insect repellents as a preventive measure against insect bites. Insect Repellent Awareness Day also serves as a reminder that insect-borne diseases are a serious public health concern and that everyone should take appropriate measures to protect themselves and their families. By using insect repellents, wearing protective clothing, and taking other preventive measures, individuals can reduce their risk of contracting insect-borne diseases and help promote public health and safety <https://nationaltoday.com/insect-repellent-awareness-day/>.

**National Insect Appreciation Day, Canada – June 8<sup>th</sup>:** There is an insect picture challenge, sponsored by Entomological Society of Canada (<https://esc-sec.ca/entomology-resources/naiad-national-insect-appreciation-day/>).

**Insect week, United Kingdom – June 19<sup>th</sup> to 25<sup>th</sup>:** For more details, check the link <https://nationaltoday.com/national-insect-week/>

**World Mosquito Day - August 20<sup>th</sup> of every year:** This day is observed to commemorate the discovery of the role of mosquitoes in transmitting malaria by Sir Ronald Ross in 1897 (<https://nationaltoday.com/world-mosquito-day/>).

**SACD Malaria Day – November 6<sup>th</sup>:** Information provided in the link <https://sacoronavirus.co.za/wp-content/uploads/2023/01/Health-Awareness-Calendar-for-2023.pdf>

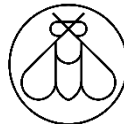
# UPCOMING CONFERENCES

## ENTOMOLOGICAL SOCIETY OF SOUTHERN AFRICA CONFERENCE

11-14 July 2023

Stellenbosch University,

Stellenbosch Central, Western Cape <https://entsocsa.co.za/event/essa-23/>



Entomological Society  
of Southern Africa



## PARASITOLOGICAL SOCIETY OF SOUTHERN AFRICA CONFERENCE

17-20 September 2023

26 Degrees South, Muldersdrift,

Johannesburg <https://savetcon.co.za/2023-51st-annual-parsa-conference/>



## PAN-AFRICAN MOSQUITO CONTROL ASSOCIATION (PAMCA)

17-21 September 2023

Skylight Hotel, Addis Ababa, Ethiopia



<https://conference2023.pamca.org/>

**ZOOLOGICAL SOCIETY OF SOUTHERN AFRICA BIENNIAL  
CONFERENCE**

**25-29 September 2023**

**Champagne Sports Resort, Drakensburg, Kwazulu-  
Natal** [https://www.sacnasp.org.za/events/zoological-society-of-southern-  
africa-biennial-conference](https://www.sacnasp.org.za/events/zoological-society-of-southern-africa-biennial-conference)



**MALARIA RESEARCH CONFERENCE (MRC)**

**1 - 3 August 2023**

**RH Hotel, Sunnyside, Pretoria**  
<https://malariaconference.mrc.ac.za/>

**STAY CONNECTED!**



Website: <https://www.wits.ac.za/wrim/>



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## FUNNY CORNER

