

THE NEW CWRR NEWSLETTER

Welcome to the sixth issue of the CWRR Newsletter 2025! As always, the CWRR Newsletter carries news and updates from our members, including staff, associates and students. For contributions, suggestions and queries, please email Dr Shaeden Gokool, GokoolS@ukzn.ac.za



CWRR STUDENTS SHINE AT PRIS 2025

The College of Agriculture, Engineering and Science at the University of KwaZulu-Natal convened its 13th Postgraduate Research and Innovation Symposium (PRIS), themed "International Year of Quantum Science and Technology", on October 28-29, 2025 at Coastlands Hotel, Musgrave. This symposium showcased the innovative research being undertaken by postgraduate students across several disciplines within the College of Agriculture, Engineering and Science. The students showcased their research through a 15-minute oral or 5-minute-flash presentation which was then assessed by a panel of internal and external judges.

In both the oral and flash categories, CWRR's very own MSc and PhD students grabbed the spotlight:

 Mr. Thobani Leon Ngwazi (MSc candidate supervised by Prof. Seifu Kebede Gurmesssa) secured first prize in the flash category for his talk on "An Assessment of Radon (^{222}Rn) Levels in Aquifers Along the Umgeni Catchment: Health and Geohydrological Significance".

 Ms. Faith Sibiya (MSc candidate supervised by Prof. Seifu Kebede Gurmesssa and Miss Kershani Tinisha Chetty) secured the research impact prize in the flash category for her talk on "Drivers of eutrophication and algal proliferation in Umgeni system dams ; Midmar, Albert Falls, Nagle and Inanda".

 Mr. Glen Mkhonta (MSc candidate supervised by Drs Daniel Kibirige and Shaeden Gokool) secured first prize in the oral category for his talk on "Evaluating the Predictive Accuracy of Coupled HECHMS-HEC-RAS Models for Flood Simulation in the Lowest Sub-Catchment of the uMngeni River, KwaZulu-Natal, South Africa".

 Mr. Thando Mthembu (PhD candidate supervised by Mr Richard Kunz and Dr Shaeden Gokool) secured second prize in the oral category for his talk on "Developing a Machine Learning Meta-Model Trained on AquaCrop Simulations to Predict Taro (*Colocasia esculenta* L. Schott) Yield in Southern Africa".

The CWRR would like to acknowledge these admirable students' outstanding achievements which serve as a testament to their hard work and dedication to their studies whilst also highlighting the role which the CWRR has played in fostering a culture of striving for academic excellence whilst undertaking research that is simultaneously impactful and innovative. We wish you an equally fruitful journey ahead in your academic careers.



From left: Dr Maqsooda Mahomed, Ms. Faith Sibiya, Mr. Thando Mthembu, Dr Shaeden Gokool, Mr. Glen Mkhonta, and Mr. Thobani Leon Ngwazi

ADVANCING RIVER MONITORING THROUGH UAV-USV INTEGRATION

GroundTruth hosted a UAV-USV workshop on 2 July 2025, demonstrating how Unmanned Aerial Vehicles (UAVs) and Unmanned Survey Vessels (USVs), together with IoT-enabled sensors, are transforming aquatic monitoring. The session showed how UAVs can rapidly gather high-resolution imagery and elevation data for mapping and habitat assessment, while USVs, including a drone-tethered survey boat, can collect bathymetric measurements and in-situ water quality data with precision.

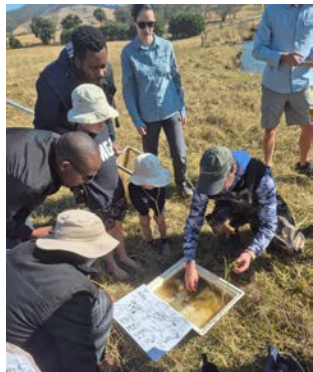
By combining UAV data from above with USV data from the water surface, researchers gain a more complete picture of river and wetland systems. This integrated approach supports improved discharge estimates, hydraulic modelling, and management of flow, sediment movement, vegetation and flood risk. The workshop highlighted how these technologies are increasingly becoming practical, routine tools for catchment monitoring and freshwater research.



TECHNOLOGY MEETS PRACTICE: RIVER ASSESSMENT AND RESTORATION

On 3 July 2025, SASAqS members joined GroundTruth for a field trip along the Lions River to see integrated UAV-USV monitoring in action. Participants observed a DJI Matrice 300 UAV guiding the GTE Explorer USV to collect water depth and water quality data, and compared this approach with traditional river cross-section surveys. The demonstration illustrated the safety advantages, efficiency, and data richness of remote-operated monitoring.

The group also had hands-on experience using citizen science tools, including the clarity tube, velocity plank and miniSASS macroinvertebrate river health assessments, reinforcing how community monitoring can complement technical data collection.



In the afternoon, the visit continued to the Mthinzima River wetland rehabilitation site near Mpophomeni, where engineered wetland structures - designed and maintained with community involvement - are improving water quality downstream. The field trip showed how technology, ecological restoration and citizen participation work best when integrated to support long-term water stewardship.

PUBLICATIONS

- Mthembu, T, Kunz, R, Mabhaudhi, T & Gokool, S. 2025. Enhancing AquaCrop model precision for accurate simulation of sweet potato and taro landraces. *Frontiers Sustainable Food Systems* 9. <https://doi.org/10.3389/fsufs.2025.1698211>
- Msesane, Q, Dube, T, Gxokwe, S., Riddell, E, & Dalu, T. 2026. Aquifer characterization for improved hydrogeological conceptualization of groundwater dependent ecosystems in the Kruger National Park, South Africa. *Journal of African Earth Sciences* 233. <https://doi.org/10.1016/j.jafrearsci.2025.105884>
- Shibambu, TH, Kahler, DM, Rose, KC, Riddell, E, Oyebanjo, OM, & Edokpayi, JN. 2025. Comprehensive monitoring of the spatiotemporal variation of water quality and its associated human health risks in Luvuvhu river catchment, Vhembe biosphere reserve, South Africa. *Scientific Reports* 15. <https://doi.org/10.1038/s41598-025-20228-x>
- Nyamakura, B, Masih, I, Werner, M, Hermans, L, & Jewitt, G. Typologies of climate service co-creation approaches in practice. *Climate Services* 40. <https://doi.org/10.1016/j.cliser.2025.100607>