

Opportunities for Postgraduate Bursary Support from the uMngeni-uThukela Water Chair in Water Resources Research and Innovation – 2025

The University of KwaZulu-Natal (UKZN) and uMngeni-uThukela Water (UUW) have had a long and fruitful relationship and have collaborated on a number of mutually beneficial projects in teaching, research and technical services. This has been formalised through a Memorandum of Agreement (MoA) between the institutions and through UUW's support of the uMngeni-uThukela Chair of Water Resources Research and Innovation at UKZN. Through the MoA and facilitated by the Chair, funding is available to support PhD, MSc and Honours level studies focussed on water resources and related research needs identified by UUW. Funding to support students working on appropriate research projects is available depending on the project and availability of funds.

Research opportunities are summarised in the Umgeni Water Research & Development Plan, and the following research project ideas have been prioritised:

- (i) **Investigation and development of approaches to strengthen water resource quality protection in the uMngeni-uThukela Water operational area:** Pollution of water resources by poorly managed land use activities such as poorly maintained municipal sewer infrastructure, industrial discharges, diesel/oil spillages, agricultural runoff and poor waste management practices is a major challenge in the whole of South Africa. The issues have been accumulating over a long time due to various factors including slow implementation of sector reforms related to establishment and operationalisation of Catchment Management Agencies, lack of political will, fragmented approach to water resource management within water services and water management institutions, lack of appreciation of the direct links between sanitation services and water services within the water and sanitation value chain, lack of focus on the governance/management and regulation of the water pollution related to agricultural activities. This has now resulted to eutrophication and algal blooms at strategic water supply dams and is disrupting water supply to municipalities such eThekwin Municipality. Hence, research needs to be undertaken to investigate approaches to strengthen source water protection and ensure water security. Studies could include investigating the causes of eutrophication in the uMngeni System (particularly above Albert Falls Dam), behavioural change, effective

regulation and compliance enforcement, and encouraging/incentivising good water quality management practices.

- (ii) **Determination of the return on investment of ecological infrastructure and catchment management activities:** These can include wetland rehabilitation, alien invasive plant management, soil conservation and restoration initiatives. Examples of investigation could include the cost and impact of the wetland rehabilitation at Mphophomeni/Mthinzi on the water quality enhancement benefits at Midmar Dam to the cost savings results on the chemicals that are being used to treat the water, or the impact of alien wattle removal in the Mkhomazi Catchment on water resource availability. It is anticipated that determination of return on investment will assure current funders and attract further investment for the upscaling of catchment management and ecological infrastructure interventions.
- (iii) **Modelling the impacts of land use change on water resources in the Mhlathuze Catchment:** UUW have recently taken over the management of water supply in this area and need to assess water resources in the catchment and the potential impacts on water resources of current and future land use in the catchment. This study could be expanded to develop an operating model for supply of water to the various sectors within the area (irrigation, industry, residential etc).
- (iv) **Review and assessment of alternative approaches to water resource system yield determination for improved and transparent determination of system yield:** Catchment water yield is currently determined in South Africa by stochastic modelling of naturalised streamflow, which is determined by accounting for the anthropogenic impacts on flow. This study will assess improved and transparent approaches to catchment water yield determination.
- (v) **Energy utilisation, efficiency and renewable energy:** UUW currently spends more than R 650 million annually on energy and projects related to energy audits, renewable and alternative energy sources, energy efficiency in water and waste water treatment works and distribution networks, converting waste to energy, monitoring systems and logistics will be considered.
- (vi) **Alternate disinfection solutions:** UUW currently spends more than R 300 million annually on chemicals and projects related to costs savings and improved efficiencies in chemical disinfections and alternative disinfection technologies will be considered.
- (vii) **Alternate coagulation and flocculation solutions:** UUW currently spends more than R 300 million annually on chemicals and projects focussed on alternate coagulation and

flocculation solutions including and chemical and technological coagulation methods will be considered.

In addition to the above prioritised research project ideas, all expressions of research interest in fields relevant to uMngeni-uThukela Water operations will be considered.

Interested postgraduate students and/or supervisors should submit a short expression of interest and include the project title, name of the student and supervisor (if known) to **Prof Jeff Smithers** (UmgeniChair@ukzn.ac.za and cc Umgenichair-Admin@ukzn.ac.za) **before 20 January 2025**. Details of a contact person at uMngeni-uThukela Water and potential bursary funding will then be discussed. The final proposal should be developed in collaboration with UUW.

Approval of a project and funding will be dependent on remaining budget availability.