

engineering), nuclear energy, energy efficiency and optimisation, heat exchangers, nanofluids, gas turbines and aerodynamics.

## Water resource management

Research into water resource management is a focus area of both the Department of Chemical Engineering and the Department of Civil Engineering. The Water Utilisation and Environmental Engineering Division in the Department of Chemical Engineering is supported in its research activities by the Sedibeng Water Research Chair in Water Utilisation Engineering (featured in this issue), while the Department of Civil Engineering enjoys

the support of Rand Water for research into water purification, supply and utilisation-related science and engineering.

### Rand Water Chair in Civil Engineering

This research chair was established in the Department of Civil Engineering in 2014, and is engaged in research on determining a change in the hydraulic capacity of pipelines.

This research, under the leadership of Prof Fanie van Vuuren, examined the elements to be considered in the hydraulic design of pipelines. The research team considered the recorded hydraulic performance of pipelines, secondary energy loss associated with the

dimensional details of the couplings, the adaptation of the friction formula to include the influence of biofilm growth, and the provision of monitoring points for the continuous or intermittent hydraulic assessment of the pipeline.

The research found it to be imperative that a periodic review of the hydraulic performance of conveyance systems be undertaken, which would be simplified if the design of water systems included sufficient access points on the system to measure flow and pressure.

### Chemical engineering

The Department of Chemical Engineering is active in a number of specialist research fields.

These include the activities of the Environmental Engineering Group (see articles on pages 125–132), the Sedibeng Water Research Chair in Water Utilisation Engineering, the SARChI Chair in Carbon Technology and Materials, the SARChI Chair in Fluoromaterials Science and Process Integration and the Institute of Applied Materials (IAM).

The IAM performs applied research for the industry. It pursues research and development targets in carbon materials and chemical product design, including modelling multicomponent mixture properties, layered solids as functional additives for polymers, green pyrotechnics and combatting malaria transmission. ➔

## Innovative research into water security receives award

Marco van Dijk of the University's Department of Civil Engineering, who has conducted groundbreaking work in the development of South Africa's first conduit hydropower facility (see article on page 59), has been recognised by the Water Research Commission (WRC).

On 17 September 2015, Van Dijk received the prestigious Knowledge Tree Award in the category New Products and Services for Economic Development. The award was made in recognition of the impact of his research, as well as his significant

contribution to water science and technology.

Water is essential for local development, particularly for sectors such as health, agriculture, economic development, education and the environment. However, 768 million people in the world do not have access to clean drinking water.

Van Dijk's research is closely aligned to the post-2015 Agenda, in which integrating universal access to drinking water and basic sanitation is a priority for the water



➔ *Dr Limakatso Moorosi, Chief Executive of Bloemwater (left), Mr Marco van Dijk (centre) and Mr Dhesigen Naidoo, CEO of the Water Research Commission.*

and sanitation sector worldwide. His particular research interests include hydropower development for rural electrification in South Africa, energy generation using low-head hydropower technologies,

and conduit hydropower implementation. He has compiled numerous technical reports and journal articles in the field of pipelines, hydropower generation and water distribution systems. ➔