

## NEWS FROM:

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Communication and Marketing Department  
Isebe loThungelwano neNtengiso  
Kommunikasie en Bemakingsdepartement

Private Bag X3, Rondebosch 7701, South Africa  
La Grotto House, Glendarrach Rd, Rondebosch, Cape Town  
Tel: +27 (0) 21 650-3733/2, Fax: +27 (0) 21 650-5682  
Internet: [www.uct.ac.za](http://www.uct.ac.za)

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## **UCT research investigates infrastructure development**

### **Road planning for developing countries, power optimisation, seamless network and fuel production**

The engineering sector in South Africa remains among the most sought-after skills areas for employers and the development or improvement of infrastructure. Five PhD candidates set to graduate from the University of Cape Town devoted their research to studying issues that could have an important impact on this sector.

#### **New framework provides seamless network service, anytime, anywhere**

Oladayo Bello's thesis, *Multi-layer traffic engineering framework for inter-working multi-hop wireless networks*, indicates that an increase in the number of network users and interfering users degrades network performance. Bello's proposes a framework that improves traffic level quality of service in inter-working multi-hop wireless networks. This will allow network users to enjoy seamless network service, anytime and anywhere.

Bello has a BSc (Hons) in Electronics and Electrical Engineering from Obafemi Awolowo University in Nigeria, a BSc (Hons) in Industrial and Systems Engineering from the University of Pretoria, and an MSc (Eng) in Electrical Engineering from UCT.

#### **Optimum power line designs for any project**

Robert Stephen's thesis, *Objective determination of optimal power line designs*, investigates the suitability of various designs of overhead lines in terms of costs and technical adequacy. The research aims to identify – at the planning and design stage – the optimum group of line designs for any project to develop further into detailed designs and construction.

Stephen holds a BSc (Eng) from University of Witwatersrand and Master's degrees in Electrical Engineering from the University of Natal and Business from the Wits Business School. He is a Master Specialist at Eskom and has chaired the international Cigré Study Committee on overhead lines.

### **Importance of context in better road planning**

Edward Beukes' thesis, *Context sensitive road planning for developing countries*, examines the use of a location's contextual setting to make road infrastructure planning and design recommendations. The thesis defines the context in terms of the suitability of a mode of transport given the land use, socio-economic, environmental and transport information. The research develops a method for quantifying and comparing the contextual setting of roads, and demonstrates that this context can vary significantly over relatively short distances. Beukes shows that context can be used to classify areas in terms of their relative suitability for various modes of transport, and demonstrates how this can be used in road planning and design.

Beukes has a BSc and an BSc(Eng)(Civil Eng) from UCT.

### **Modelling the whole WWTP as an interconnected set**

David Ikumi's thesis, *The Development of a Three-Phase, Plant-Wide Mathematical Model for Sewage Treatment*, shows how modelling and computer simulation of municipal wastewater treatment plants (WWTP) has progressed over the past decade from modelling only the individual unit operations of a WWTP separately, to modelling the whole WWTP as a set of interconnected unit operations. Ikumi's research focused on addressing research questions that arise when connecting WWTP unit operations. Ikumi completed the BSc (Eng) in Civil Engineering in 2006, and commenced an MSc (Eng) degree specialising in water quality engineering.

### **Breaking new ground in crystallite oxidation**

Nico Fischer's thesis, *Preparation of nano and ångström sized cobalt ensembles and their performance in the Fischer-Tropsch synthesis*, examines the effects of crystallite size in cobalt-based Fischer-Tropsch carbon monoxide hydrogenation for fuel and chemical production. For the first time it could be shown that oxidation of crystallites can occur at reaction conditions and that smaller crystallites are more susceptible to undergo this undesirable transformation. These findings are considered of crucial importance to ensure maximum metal utilisation.

Fischer has an MSc in Chemical Engineering from the University of Karlsruhe. He has been studying at UCT, in the Department of Chemical Engineering and at the Centre for Catalysis Research, since 2008. His study was conducted under the scientific Synthesis Gas Programme of the national DST-NRF Centre of Excellence in Catalysis.

**ENDS**

**Please note:** Information in this release is based on the supervisor's citation for the PhD thesis. UCT advises journalists to obtain a copy of the thesis and/or interview the PhD graduate to verify and expand on this information.

***Issued by: UCT Communication and Marketing Department***

**Mologadi Makwela**

Tel: (021) 650 5427 Fax (021) 650 5628

**Cell: 078 258 3965**

E-mail: [loga.makwela@uct.ac.za](mailto:loga.makwela@uct.ac.za)

University of Cape Town

Rondebosch

Website: [www.uct.ac.za](http://www.uct.ac.za)