

Funding for a MScEng Study (Chemical Engineering) or MSc (Crop Science): Use of recovered water from a reinvented toilet for hydroponics

The Pollution Research Group, School of Engineering and the Discipline of Crop Science (University of KwaZulu-Natal, Durban, South Africa), in conjunction with the University of South Florida (USA) (**funding consortium**) has secured funds from the Bill & Melinda Gates Foundation for a research and development project on faecal sludge management and the field testing of reinvented toilet prototypes. Details on the prototype can be seen at <http://NEWgenerator.tumblr.com> and a TEDx talk on bio recycling at <http://tinyurl.com/TEDxUSF-DanielYeh1>. The water that is recovered from the reinvented toilet contains all the nutrients present in the excreta. It is intended to use this resource rich recovered water for the production of high value crops using hydroponics and meet the regulatory standards for discharge to the aquatic environment.

To understand the feasibility of this upcycling of the nutrients, the **Funding Consortium** are recruiting a **Masters student** to undertake a study quantifying composition of the recovered water and its suitability as a growth medium for plants growing throughout the year in the subtropical Durban climate. In addition the final nutrient concentration needs to be sufficiently low that it can be safely discharged to the environment.

This project will focus on:

- Undertaking a survey of chemical composition of the recovered wastewater
- Selecting suitable plants for the investigation
- Assessing the growth characteristics (physiology, biomass accumulation and nutritional quality, including safety) of the selected plants
- Measuring the composition of the nutrient depleted wastewater
- Designing a suitable system to utilise the nutrients through the year (24/7/365) to a sufficiently low level so that discharge to the aquatic environment will be acceptable

The expected outcome is to generate knowledge that will enable the relevant stakeholders to reuse the nutrients from the reinvented toilet. This will support the commercialisation and scale-up of products and services being tested in the wider research project.

The **MScEng / MSc** research project will require a versatile and self-motivated candidate who ideally has knowledge of quantitative aquatic chemistry. Experience in water and sanitation in developing countries will be an asset. The research will involve laboratory and field work in communities situated in informal settlements and the handling wastewater from reinvented toilet facilities.

The position will start from January 2018. A total bursary of **R 120 000** (over 1 to 2 years) will be provided. Payment is made on the achievement of agreed deliverables. The project will also cover the cost of a computer, tuition fees and all research operating expenses for conducting field work.

The candidates should have an academic background in engineering or crop science and understanding of statistical concepts used in agricultural sciences, and be prepared to handle faecal material. In addition, for health and safety reasons, the successful applicant will need to undergo the necessary inoculations. A working knowledge of isiZulu would be a strong recommendation.

If you are interested in this position, please submit an electronic copy of your transcript, degree certificates and a CV with two referees and a covering letter explaining your motivation to **Dr Lembe Magwaza** (Magwaza@ukzn.ac.za) copied to **Ms Susan Mercer** (mercera@ukzn.ac.za). Only shortlisted applicants will be contacted and the deadline for applications is **31st December 2017**.

Pollution Research Group
Discipline of Chemical Engineering, School of Engineering

Postal Address: Howard College Campus, Durban 4041, South Africa

Telephone: +27 (0)31 260 3375 Facsimile: +27 (0)31 260 1118 Email: buckley@ukzn.ac.za Website: www.ukzn.ac.za

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville