

Bursary for a Master student available at the Water, Sanitation and Hygiene R&D Centre (formerly the Pollution Research Group), University of KwaZulu-Natal (Durban, South Africa), for an investigation of moisture boundedness in different types of faecal sludge and fresh faeces

Well managed on-site sanitation requires adequate treatment of the faecal waste. One of the critical treatment processes is to remove large amounts of water from the faecal waste through dewatering and drying to enable reduction the pathogen content of the faecal material, minimize the volume and weight of the waste, and also increase the calorific value for post-treatment reuse. However, there are crucial knowledge gaps around the dewatering and drying processes of faecal material, leading to inefficient processes, failures, incomplete treatment and unsafe disposal.

The Pollution Research Group, at the University of KwaZulu-Natal (Durban, South Africa) is conducting a research project, funded by the Water Research Commission, to understand how moisture is bound inside various faecal streams, namely faecal sludge from on-site sanitation facilities and fresh faeces. This investigation will involve the identification, quantification and characterization of the different types of moisture inside the sludge (i.e. unbound moisture, capillary moisture, physically bound moisture, chemically bound moisture and intracellular moisture). The findings from this investigation are expected to provide deeper insight of the faecal matter characteristics, as well as valuable information and knowledge that could result in improved design and optimization of dewatering and drying processes, as well as aid in the development of innovative solutions for the treatment of faecal matter.

A MSc student is required for this project with the task to characterize the mechanical and thermodynamic aspects of moisture boundedness. This work will entail the experimental determination of moisture boundness and modelling of sorption isotherm curves, from which different parameters will be determined, such as the water activity and heat of reaction. Different types of faecal sludge will be involved in this experimental work, such as faecal sludge from septic tanks, pit latrines and urine diversion dry toilets, as well as fresh faeces.

A total bursary of R 150,000 will be paid to the MSc student over 15 months, with the possibility to receive a bonus of R20,000 according to the performance displayed during this period. Payment is made on set deliverables being achieved. The project will also cover the cost of a computer, tuition fees, all research operating expenses for conducting field work, the repatriation expenses (set until a certain limit) and the costs of a local conference.

It is required that the candidate for the position possesses a Chemistry or Chemical Engineering degree with a strong background in chemical thermodynamics and sorption phenomena. Laboratory skills, as well as ability to model and use of software as Matlab or similar, will be highly appreciated. The position is to start from the January 2021.

UKZN is an equal opportunities employer. To apply for the position, please send a letter of motivation, an electronic copy of your transcripts, diplomas and CV to Mr. Arunkumar Rayavellore Suryakumar <220112475@stu.ukzn.ac.za> and Dr. Santiago Septien Stringel <septiens@ukzn.ac.za> before the 10th of December 2020.

**Pollution Research Group
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