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UCT team wins global sustainability award for self-sustaining toilet hub

A University of Cape Town (UCT) lecturer and his team have won an international sustainability competition with their self-sustaining toilet hub that converts urine and faeces into fertilizers and compost.

Dr Dyllon Randall, a senior lecturer in water quality in the Department of Civil Engineering, and his multi-national team won the global sustainability prize at UNLEASH 2018 held in Singapore recently with their SaniHive prototype – a modular, fully integrated design inspired by the structure of honeycomb and maximises space in an urban slum.

Randall said: “The toilet hub is not connected to a conventional sewage network, requires no electricity to operate and it can be easily scaled up by merely increasing the number of toilet hubs using the profits generated from the waste recycling.”

“It contains a urine treatment process as well as a faeces collection system for eventual composting. It’s different to current toilets in this area because it separates the urine and faeces within the toilet while using no water,” he continued.

Phosphorous recovery from urine for fertiliser is one example of this.

SaniHive, derived from sani for ‘sanitation’ and hive from the ‘beehive’ inspiration, took the laurels for the United Nations Sustainable Development Goal (SDG) 6: Clean Water and Sanitation, as well as the Global Scalability Potential award, beating the 995 other contestants and 169 other solutions.

“The innovation would create employment, as local people could transport the waste to mini treatment plants where high-end products could be created,” Randall emphasised.

Professor Pilate Moyo, head of the Civil Engineering department, commented: “It is very rewarding to see one of our young researchers being recognised for their innovative work. As a department, we value innovation. We are extremely proud of Dyllon and the pioneering work he is doing in wastewater.”

UNLEASH 2018 is a global innovation lab that brings together 1 000 top young talents (aged between 20 and 35 years) from 100 countries to create real, scalable solutions to the SDGs on food, water, health, education, energy, urban sustainability, responsible supply chain and so on.

Randall represented UCT with Jessica Fell of the Future Water Institute. They were both working on the same SDG, but in different teams.

Urban slum communities need sustainable sanitation that meets the needs of high population density, because the current temporary portable toilets are largely inaccessible due to space constraints leading to situations where many people must share a few toilets, leading to poor sanitary conditions.

With projections of close to one billion urban slum dwellers by 2030, Randall believes that sanitation innovations will play a big part in ensuring clean water and sanitation – and in creating sustainable cities and healthy citizens.

“But it doesn’t have to be an urban slum,” he adds. “You can use the same methodology in richer suburbs, where you create an integrated, decentralised system with a mini treatment plant in the neighbourhood. The challenge would be to separate the waste.”

The Engineering and Built Environment faculty deputy dean for transformation and social responsiveness, Associate Professor Tanja Winkler, added: “As a faculty, we hope to develop innovative solutions to some of the socio-economic challenges facing our country and continent. We also remain committed to promoting sustainable outcomes via engaged scholarship and the co-production of knowledge. This is precisely what Dyllon is doing. His work is inspirational, and has great potential not only to generate employment opportunities, but also to add value to waste.”

Randall and his group hope to pursue the SaniHive innovation, and plan to approach funders to help commercialise this technology.

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