



RESEARCH DEVELOPMENT &  
POSTGRADUATE STUDIES

# Postdoctoral Fellowship

Communication (3) | December 2021

## 2021 ANNUAL POSTDOCTORAL WEBINAR: THE RELEVANCE OF RESEARCH AND THE COVID-19 PANDEMIC

The postdoctoral fellows of CUT presented their research at the 2021 annual postdoctoral webinar on the 25 of November 2021, hosted by the Research Development and Postgraduate Studies Section.

The webinar aimed at allowing the postdoctoral fellows an engagement opportunity with not only the CUT community, but the external networks. The postdocs presented on the relevance of research and the Covid-19 pandemic.

Ms Edith Sempe, acting Senior Director: Research Development and Postgraduate Studies, opened the webinar by giving some background information regarding the postdoctoral fellowship as CUT.

Ms Cecilé Olivier, postdoctoral coordinator gave a brief overview of the current state of the postdoctoral fellows programme, focusing on funding, research outputs, supervision and background information. It's noted that the funding is not just awarded by the university, but also include external funding agencies such as the NRF.

The postdoctoral fellowship not only benefits the university in terms

of growth and research, but also the postdocs to prepare them for an academic career. CUT provides the opportunity to the postdoctoral fellows to grow and become researchers in their own right, by doing cutting edge research, supervising masters' and doctoral students and having a mentor to guide, direct and supervise them.

The two highlights of the event were (1) the presentations by the postdoctoral fellows and (2) the booklet that is showcasing our postdoctoral fellows and their research. The booklet also focus on the profiles of the postdoctoral fellows.

The postdoctoral fellows are contributing in various ways in fulfilling the CUT mandate in becoming a leading African University of Technology shaping the future through innovation and upholding the Vision 2030. Sustaining existing collaborations and growing future networks with especially continental and international partners will assist in making an input to the research agenda of the university.

Please visit our website on <https://www.cut.ac.za/cut-postdoctoral-fellowship-programme> for detailed information.

## Postdoctoral Portfolio

### Reporting period: January 2021 – December 2021

- Total value of the award: R 1 810 000
- Total number of postdoctoral fellows: 8
  - Track 1: 8 (Full-time)
- Number of universities our postdocs graduated from: 7
  - 6 x National Universities
  - 1 x International University
- Gender breakdown:
  - 5 x Female
  - 3 x Male

### Postdocs affiliated with Research Centre's:

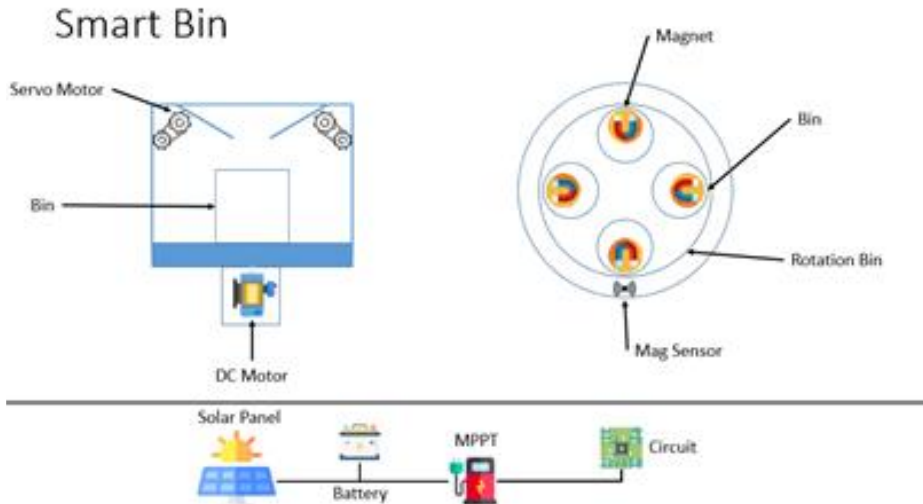
- 2 x Centre for Applied Food Safety and –Biotechnology (CAFSaB)
- 1 x Centre for Diversity in Higher Education Research
- 2 x Centre for Enterprise and Entrepreneurship Studies
- 1 x Centre for Rapid Prototyping and Manufacturing (CRPM)
- 2 x Centre for Sustainable Smart Cities

# SUCCESSSES OF OUR POSTDOCTORAL FELLOWS

**Congratulations to our posdocs on their great achievements**

## Smart Waste Bin – Dr IE Agbehadji

The University currently has waste bins for Polystyrene, Tins/Cans, Plastic, and Paper. However, it lacks the supporting technological devices to assist with waste detection and classification. Hence, the research applies 4IR technologies for object waste detection to create a smart waste bin that is supported by edge computing capability. An electronic schema and micro-controllers (figure 3) were designed, which will be embedded on the smart waste bin in the figures (1 and 2). The source of power for the smart waste bin is solar. In figure 2, the interior of the smart waste bin has five garbage containers: Polystyrene, Tins/Cans, Plastic, Paper and the fifth is for any other garbage.



**Figure 3:** Schematic design of the smart waste bin and other components

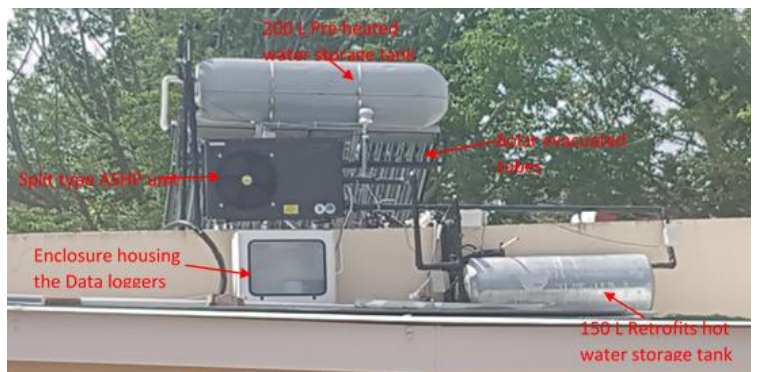
## Design of a hybrid solar assisted air source heat pump water heater: Modelling and simulation – Dr Tangwe Stephen

Dr Stephen's research project is focused on smart energy conversion systems with special interest in energy efficiency and renewable energy technology in the domain of sanitary hot water heating. The research exploits the design and installation of an innovative residential hybrid solar assisted air source heat pump water heater. Furthermore, thermofluid physics-based and machine learning (artificial neural network) models are going to be developed and used to predict the energy performance of the proposed design technology.

The aim of the research is to develop a methodology to evaluate the techno-economic performance of a domestic hybrid solar assisted air

source heat pump water heater via thermofluid and artificial neural network models.

The installation of the propose residential hybrid solar assisted air source heat pump water heater:



**Figure 1:** Physical part of the smart waste bin



**Figure 2:** Interior of the smart waste bin

# PUBLICATIONS



## Research publications by our Postdoctoral Fellows

### Dr IC Nwafor

- a) IC Nwafor & IT Manduna. 2021. Local processing methods for commonly used medicinal plants in South Africa. *Medicinal Plants*, 13 (2), 289-301. DOI:10.5958/0975-6892.2021.00032.0.
- b) Nwafor, I.C., Roberts, R. & Fourie, P.J. 2021. Evaluating the in vivo efficacy of dry chicory (*Cichorium intybus*) roots for growth promotion and fecal egg count reduction. *33rd Virtual Conference of the Australian Association of Animal Science*, 1-4 February 2021.
- c) Nwafor, I.C., Motsoari, T., Manduna, I.T., Buwa-Komoreng, L. & Ngobani, B. 2021. Investigation of plants used for ethnoveterinary purposes in the highland grasslands of the Free State, South Africa and Lesotho. *Virtual International Conference on Traditional Medicine and Phytochemistry (TMED-Australia)*, 12-14th July 2021.
- d) Nwafor, I.C., Bila, L. & Mafanya, B. 2021. Covid-19 conversations with smallholder livestock farmers in Potchefstroom, North West province, South Africa. *52nd Congress of the South Africa Society of Animal Science (SASAS)*, 10-12 August 2021.

### Dr T Stephen

- a) Tangwe, S. & Kusakana, K. 2021. Potential energy optimisation in a domestic air to water heat pump. *International Journal of Exergy*, 1-18.
- b) Tangwe, S. & Kusakana, K. 2021. The employment of artificial neural network to predict the performance of an air to water heat pump. *International Journal of Smart Grid and Clean Energy*.
- c) Tangwe, S. & Kusakana, K. 2021. Evaluation of the thermal performance of an air source heat pump water heater due to stratification: Experiment and Modelling. *Energy Report*.
- d) Tangwe, S. & Kusakana, K. 2021. Evaluation of the coefficient of performance of an air source heat pump unit and an air to water heat pump. *Journal of Energy in Southern Africa*, 32(1), 27-40.
- e) Tangwe, S. & Kusakana, K. 2020. A statistical methodology to compare the performance of residential air source heat pump water heaters. *International Journal of Sustainable Energy*, 1-20.

### Dr A Milne

- a) Milne, A. & Mhloho, M. 2021. Lessons for South Africa from Singapore's gifted education – A Comparative Study. *South African Journal of Education*, 41(1). <https://doi.org/10.15700/saje.v41n1a1839>.
- b) Milne, A. 2021. Gifted learners environmental perceptions about the present mathematics situation in South Africa. *24<sup>th</sup> Biennial World Conference of the World Council for Gifted and Talented Children*, 31 July – 8 August 2021.

## Training

### CREST Online Training Course for Supervisors of Doctoral Candidates at African Universities – Stellenbosch University

The CREST course offers a flexible study opportunity to academic staff members, particularly novice doctoral supervisors, who are interested in advancing their knowledge, skills and networks in doctoral supervision. The course is presented over eight weeks of course work, followed by one month to complete a short Capstone Assignment.

The following postdoctoral fellows attended the supervision course:

- Dr AM Lepheana
- Dr GG Lenetha
- Dr IC Nwafor
- Dr TC Dzogbewu

## NEXT MEETING

### Quarterly meeting dates for 2022.

Please note the following tentative meeting dates for 2022:

Date: 1<sup>st</sup> Meeting – 23 March 2022

2<sup>nd</sup> Meeting – 27 May 2022

3<sup>rd</sup> Meeting – 24 August 2022

4<sup>th</sup> Meeting – 21 October 2022

Time: 14:00 – 16:00

Via: MS Teams Platform

Agenda items to be submitted to Ms Cecilé Olivier ([olivierc@cut.ac.za](mailto:olivierc@cut.ac.za)).

## ANNUAL WEBINAR

### 2022 Annual Webinar

Date to be confirmed for the 2022 annual postdoctoral webinar.

## REMINDER!

### Submission of mid-term reports.

Please take note of the date for the submission of mid-term reports as indicated in the award letter.

## CONTACT US

For any additional information regarding the postdoctoral fellowship, as well as the current fellows employed at CUT please contact:

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