

UNIVERSITY OF ZIMBABWE



**FACULTY OF ENGINEERING
STUDENT PAPERETTE COMPETITION - 2018**

A green banner for the competition. On the left is a large version of the University of Zimbabwe crest, surrounded by a circular arrangement of blue and white spheres. In the center, a hand in a suit jacket holds several interlocking gears. On the right is a smaller version of the university crest. Below the hand holding gears, the text reads: "UNIVERSITY OF ZIMBABWE", "In conjunction with", "THE ZIMBABWE INSTITUTION OF ENGINEERS", "FACULTY OF ENGINEERING", "STUDENT PAPERETTE COMMITTEE", and "THEME: Strategic Ingenuity for Open Innovation". At the bottom right, there is an image of a robotic hand holding a gear.

June 2018

ORGANISING COMMITTEE:



Dr. T. Mushiri (Chair), Mechanical Engineering Department

Mr Mutsambiwa, Soil Science & Agricultural Engineering Department

Eng E. Mabunda, Director Centre for Continuing Engineering Education (CCEE),

Faculty of Engineering

Dr T. Marisa, Electrical Engineering Department

Eng S. Shumba, Civil Engineering Department

Mr R. Mlambo, Geoinformatics & Surveying Department

Mr. B. N. Dube, Aeronautical Engineering Department

Eng. T. Chikuku, Mechanical Engineering Department

Mr K Dzwiti, Mining Engineering Department

Eng. L. Magombo, Industrial Liaison Officer, Faculty of Engineering

Mr J. Mhandu, Metallurgical Engineering Department

Dr Eng. T. Stevenson, ZIE Mashonaland Area Representative

Mrs. P. Tengwa, Office and Information manager, Faculty of Engineering

Preface

The Faculty of Engineering held its students Paperette Competition on the 8th of June 2018 and this will spill into the National Engineering Students Awards Competition (NESAC). The Zimbabwe Institution of Engineers (ZIE) has formed the (NESAC), a nationwide competition that draws Zimbabwe's best and brightest undergraduate engineering students together to showcase their technical, communication and innovative skills in this challenging competition. One of the key functions of the Zimbabwe Institution of Engineers (ZIE), in liaison with the Engineering Council of Zimbabwe (ECZ), is to promote good engineering practice in Zimbabwe. ZIE realizes that it has a role to play in facilitating and ensuring that the training of engineers and technicians is of the highest quality possible.

Since the 1970s, ZIE together with the University of Zimbabwe (UZ), the only university that trained engineers then, held an annual final year students' projects competition which was called "the Student Paperette Competition". This competition drew a single candidate from each of the departments under the Faculty of Engineering at UZ. The main thrust of the competition was to promote innovation among students, leading to improvement in the quality of the engineering graduates, thus contributing towards national, social and economic development.

The innovative ideas have to be developed into actual usable machinery and products. This can only be achieved when industry, together with universities identify potential projects and enter partnership agreements for commercializing them instead of such innovative projects to just end in mere theoretical presentations. The thrust of this competition is to work closely with the Zimbabwean industry at large to ensure usability of the ideas and projects; to turn them into "proudly Zimbabwean" brand.

1.0: Student Paperette Competition 2018

The event took place on the 8th of June 2018 between 14:00 hrs and 19:00 hrs in the Humanities Lecture Theatre (HLT) 500 at the University of Zimbabwe. The Director of Ceremonies (DC) of the event was Dr S. Misi (Acting Chairman-Geoinformatics and Surveying Department) who introduced the event. The DC stated that the main purpose of the Paperette Competition was to identify promising innovative works and that it has become a preliminary competition for the National Engineering Students Awards Competition (NESAC). He also commended the University of Zimbabwe for winning the National Competition in 2017.



Figure 1: Master of Ceremony - Dr S. Misi

The Dean of the Faculty of Engineering at University of Zimbabwe Dr H Makurira then introduced The Pro-Vice Chancellor of University of Zimbabwe, Professor P. Mashiri and the Guest of Honor, Mrs C. Mtasa, who is the Managing Director for TelOne.



Figure 2: From left to right Professor P. Mashiri, Mrs C. Mtasa and Dr H. Makurira

1.1 Welcome Remarks

The Pro-Vice Chancellor welcomed the Guest of Honour Mrs Chipo Mtasa, the Engineering Council of Zimbabwe, the judges and Dr Kodzwa, the Benefactor of the Student Paperette Competition. He remarked on how the occasion was important for U.Z and that the 7 departments showcasing their projects should respond to the engineering needs of Zimbabwe. He emphasized that the trophy was not important but the outcome. He said that the desire to colonise other nations can be achieved through innovations and the participating students should not be bound by geographical boundaries and he emphasized members to change lives and attribute the success to U.Z. He applauded the fact that industries are ready to partner with universities in the idea of dreaming big and hoped that whatever the students showcased will not only bring a trophy but bring innovations that change people's lives. He concluded by emphasizing that U.Z was open for business and encouraged students to be relentless, resilient and persistent making so much noise that their innovations will be available in households so we can say Made in Zimbabwe with a small signature at the bottom using the new Innovation Hub under construction.



1.2 Rules of the Competition

The DC outlined the rules of the competition as follows:

1. Each student was given 15 minutes to present and a timer was going to be available for the students to keep track.
2. Five minutes were going to be for answering questions.

Presentations started at 15:15 hrs and ended at 17:37 hrs.

Table 1: Presentations by students

Student Project Name	Main Highlights of the presentations	Department
Mudadisi Owen Waste polystyrene insulated banana ripening facility with automated control for scale banana ripening	-Small scale farmers have so much loss on the ripening as they use cardboard boxes. -No effort has been made to explore better facilities to properly ripen their products. -The bananas ripened in 3days (index 5) compared to the 4-7 days of the control	Agricultural Engineering 
Mutemi Stanford A point of use biosand filter for Glenwood Park in Epworth	-Africa lacks adequate safe drinking facility. -47% lack safe drinking water. -Epworth people using ground water which is prone to water borne diseases. - The invention slightly differed from the rural	Civil Engineering 

	<p>technic in that Iron and bacteria were eliminated meeting the WHO standards for safe drinking water.</p>	
<p>Chitate Malcom</p> <p>Tobacco curing monitoring system</p>	<p>-Designing a system that monitors tobacco when the farmer is not around with the help of IoT.</p> <p>- Zimbabwe's 26 percent of exports being tobacco, the project looked at a potential of a double increase in figures of exports if the tobacco quality is increased by proper tobacco curing.</p>	<p>Electrical Engineering</p> 
<p>Kapfumo Simbarashe</p> <p>Site suitability analysis for small hydropower generation along a river catchment</p>	<p>-Zimbabwe has plenty of rivers but the implementation of small hydropower generator is not available due to the ignorance of proper road map (where exactly to place one and how?).</p> <p>-As a Surveyor the Competitor outlined all the steps and process needed for the implementation of a hydropower generator along a river catchment.</p>	<p>Geoinformatics and Surveying</p> 
<p>Kurebwa Joseph Garikai</p> <p>Design of a robotic first aid system for passenger-car occupants</p>	<ul style="list-style-type: none"> • A literature study on the past, present and future of automobile emergency healthcare was presented to give deeper insights into the topic. • Functionality, positional and internet of things requirements for the robotic first aid system were also 	<p>Mechanical Engineering</p> 



	<p>presented.</p> <ul style="list-style-type: none"> •The research carried out so far lays a foundation for further development and implementation of passenger car robotic first aid. It is set to enrich lives around the world through health, personal safety and emotional wellbeing. It is also anticipated to drive Zimbabwe towards sustainable development by inspiring and investing in advanced machines (robotics), automation and the internet of things – Industry 4.0. 	
<p>Goora Innocent</p> <p>Revival of a deep-cycle deka gel battery</p>	<ul style="list-style-type: none"> - Gel batteries cost \$ 2 100 each (there are imported) and Zimbabwe as a nation is in strong need of them. -The university of Zimbabwe is in possession of four of these batteries but the problem we have is failure to revive this batteries once there are used up. -This particular competitor took it upon himself to revive these batteries stating that the nation possesses all the required inputs for the revival process. 	<p>Metallurgical Engineering</p> 
<p>Nyabote Tonyson</p> <p>Automation of drilling parameters for optimum drilling performance</p>	<ul style="list-style-type: none"> -The student described the automation of drilling parameter for optimum drilling performance. - From his presentation it was noted that his proposition would increase the bit life, penetration rate and safety. 	<p>Mining Engineering</p> 



Figure 3: The seven oral Paperette competition participants

1.3 Presentation of sponsors

The University of Zimbabwe would like to acknowledge the following sponsors for their support towards this event:

1. Econet
2. ZERA
3. SAPP
4. Elevate TRUST
5. Dairibord Holdings
6. Delta Corporation
7. Zimplats
8. Dr Eng Tammy Stevenson

Highlights Of The Event

1.4 Speech by Guest of Honour – Mrs Chipo Mtasa

Mrs Chipo Mtasa, the Guest of Honour expressed gratitude to be part of the competition as the guest of honor and also appreciated the level of competition displayed by the students. She applauded all the presenters for the job well done and how they showed their understanding on the topics they were presenting. She also gave her best wishes to the winners and thanked sponsors and organisers of the Paperette Competition hoping that the competition can grow to both regional and global levels.



Figure 4: Presentation by our Guest of Honour



Figure 5: Presentation by one of our sponsors, a representative from Elevate Trust

1.5 Report by Judges' Representative

There were 20 entries of posters and the best 3 were announced as follows:

Table 2: Top three winners of the posters category

Position	Name	Project Title	Department
1	Panashe Mombayarara	Design of a contact assistive robot for the disabled, elderly and infirm people: Case for developing countries.	Mechanical Engineering
2	Nyasha Mkandla	Integrated municipal solid waste processing and waste to energy power plant, Case for Harare, Zimbabwe.	Mechanical Engineering
3	Christian Chipoperwa	Re-design of Rukodzi Mine ventilation system to suit boundary extension	Mining Engineering



Figure 6: Top Three Poster Winners together with the Best Female Poster Presenter From Left to Right- Nyasha. M. Mkandla, Chrispen Chipoperwa, Eunice Muvuti and Panashe A. Mombayarara

A special trophy was given to the best female poster which went to Eunice Muvuti from the Metallurgy Engineering Department and this was sponsored by Elevate Trust.



Figure 7: Best Female Poster Presenter - Eunice Muvuti (middle) being presented her trophy by Elevate Trust

For the oral competition the results were as follows:

Table 3: Results of the Oral Competition

Position	Name of the Student	Project Title	Department
1	Kurebwa Joseph Garikai	Design of a robotic first aid system for passer-car occupants	Mechanical Engineering
2	Mudadisi Owen	Waste polystyrene insulated banana ripening facility with automated control for scale banana ripening	Agricultural Engineering
3	Mutemi Stanford	A point of use Biosand filter for Glenwood Park in Epworth	Civil Engineering
4	Goora Innocent	Revival of a deep-cycle deka gel battery	Metallurgical Engineering
5	Nyabote Tonyson	Automation of drilling parameters for optimum drilling performance	Mining Engineering
6	Chitate Malcom	Tobacco curing monitoring system	Electrical Engineering
7	Kapfumo Simbarashe	Site suitability analysis for small hydropower generation along a river catchment	Geoinformatics and Surveying



Figure 8: Winner of the Oral Category - Joseph G. Kurebwa together with the Pro-Vice Chancellor and the Dean of Engineering



Figure 9: Judges' representative Eng. Clara Sadomba presenting results



Figure 10: Competitors with the Pro V.C, Dean and judges

All students were presented with certificates. Judges and special guests were presented with tokens of appreciation.



Figure 11: Tokens of appreciation given to the Pro V.C, Dean and Chairman of Paperette Committee



Figure 12: Dr Kodzwa Benefactor for the Student Paperette Competition

1.6 Closing Remarks and Vote of Thanks

Closing remarks and vote of thanks were given by the Dean of Faculty, Dr Makurira who thanked all sponsors for the 2018 Paperette Competition, Dr Kodzwa, Staff, Judges, Competitors and all that were present at the event.

1.7 List of Rapporteurs at UZ.

Ms Jennifer Chiroodza – Lecturer Electrical Engineering (Chief Rapporteur),
Mrs Gladys Mumhure – GTA Mechanical Engineering,
Mrs Nancy Mabwe – Lecturer Metallurgical Engineering and
Mr Cleopas Mpofu – Lecturer Civil Engineering.

1.8 List of Judges

NAME
Eng M. Juma
Eng. Samson Sumani
Eng. Chabuka Albert
Eng. Mutematsaka Wonder
Eng. Sadomba Clara (Chief Judge)
Eng. Tendai Katsuwa
Dr. Charles Paradzayi
Eng. J. Mutisi
Mr. Kudzai Mauwa

THANK YOU