SEPTEMBER NEWSLETTER

SEPTEMBER 2019 ISSUE
ISSUE 9

RESEARCH AND INNOVATION OFFICE

Inside this issue

ANNUAL RESEARCH DAY 2

ANNUAL RESEARCH DAY 3

INTERNATIONAL LITERACY DAY 4

ENERGY CHALLENGES 5

ENERGY CHALLENGES 6

REHABILITATION OF UMGUZA 7

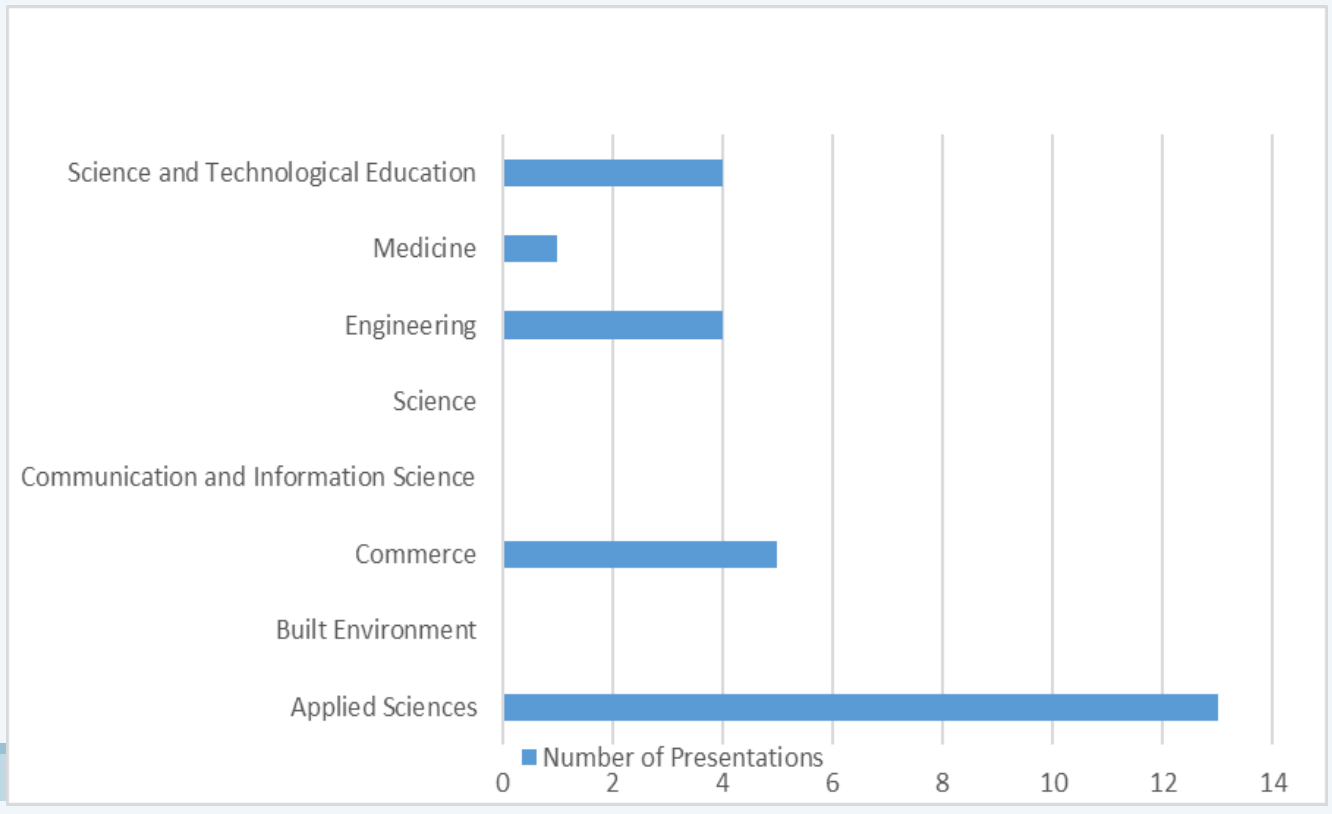
THE 7th ANNUAL RESEARCH DAY REPORT.

What commenced during the research day?

The Seventh NUST 'Annual Research Day' was held from the 20th to the 21st of June 2019. Fifty one abstracts were received from all the faculties at NUST except FOBE and CIS. Thirty of the abstracts were accepted for presentation. The majority of abstracts that were not accepted were proposals or concept notes of proposals. Four of the presenters did not turn. Among the 30 presentations, 12 of the presenters were grantees sponsored by the Research and Development Board to travel to and present at Regional and International Conferences. The remainder were presenters who responded to the call of proposals. The research areas cover a wide range of topics from improving rural livelihoods, finance, health and water and sanitation.

"Creativity is intelligence having fun."
– Albert Einstein

Table 1. Number of Presentations at the NUST Research Day per Faculty



2.0 Comments on Presentations

The quality of presentations was a mixed bag. The following were noted during the presentations:

- ◊ The majority of presenters were able to present within the time allocated to them. A few presenters did not stick to the time limit.
- ◊ Several presenters need to be assisted in designing their slides. Some of the slides had too much text and some of them had wrong colour combinations.
- ◊ Some of the presenters were reading sentence by sentence on the slides, as a result they ended up not facing the audience.
- ◊ Some of the presenters need assistance in presenting the methodology used to collect data and summarizing the major findings.

List of Winners at the 2019 Annual NUST Research Day

Faculty/ Department	Presenting Author	Co-Author/s	Title of Paper	Category
Applied Sciences Applied Physics	Nunu . W	Ncube,. B , Dube. O, Mpofu. C , Ndlovu. B and Khumalo. N	Nutritional factors associated with distribution of Mopani Worms (Imbrasia belina) in Mopani woodlands in Tsholotsho and Gwanda Districts, Zimbabwe. A comparative survey.	Senior
Applied Sciences Applied Biology	Change . J	Siwela . A .H and Basopo. N	Oxidative stress associated with pollutants from coal mining activities on aquatic plantsA case study of a coal mining region in Matabeleland North, Zimbabwe	Junior
Commerce GSB	Dube.T	Dube.T, Zikhali. W. Dube. S.P and Chinjova. F	The application of the Servant Leadership Management Model by selected Non-Governmental Organizations in Zimbabwe: A case of cultural heritage and governance study of Western Region Non-Governmental Organizations	Senior
Commerce Marketing	Makanza .C	Gatsi. C and Nyadombo. D	Impact of the service cape on customer satisfaction based on Bitner's services cape model. A case of hotel industry players in Mutare	Junior
Medicine	Dube .S.P	Waghid .Y and Luzane. T.L	Examining Relations between Educational Policy and Higher Education Students' Access into Industry in Zimbabwe	Senior
STE Science, Maths and Tech Education	Sibanda . L	N/A	Assessment for Learning in Higher Education: Experiences of One University in Zimbabwe	Senior
FIT Electrical Engineering	Nyoni. B	N/A	A training utility for estimating the bowling speed of a cricketer using accelerometer data	Senior
FIT Chemical Engineering	Muzangwa . T	Hlabangana. N	Bio-briquetting of coal using coal waste fines and agricultural residues	Junior

INTERNATIONAL LITERACY DAY.

The 8th of September was proclaimed as International Literacy Day (ILD) at the 14th session of UNESCO's General Conference on 26 October 1966. Since 1967, International Literacy Day (ILD) celebrations have taken place annually around the world to remind the public of the importance of literacy as a matter of dignity and human rights, and to advance the literacy agenda towards a more literate and sustainable society.

At University level the Research and innovation Office focused on finding out more on Information Literacy which is defined as the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning . **https://www.un.org/en/events/literacyday/**

NAME: Dr T Matingwina

DEPARTMENT: Library and Information Science.

The Research and Innovation Office interviewed Dr Matingwina from the Department of Library and Information Science on what information and digital literacy is about and this is what he had to say:

Information literacy can be viewed as a set of skills of abilities which include the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information in solving a problem. Other dimensions of literacy include digital literacy, media literacy and cultural literacy and other forms of skills which enable an individual to thrive in today's digital and complex society.

The role of the librarian is to administer information literacy to students and the librarian is involved in teaching information literacy to enable library users to be independent and effective users of information resources, specific services include User education, Library orientation, Reader advisory services, Term paper counselling.

Literacy is the heart of sustainable development. There is no development without research and accurate information. Librarians work with researchers and policy makers through research support services, they help with providing valuable literature for researchers, bibliographies of important articles, they teach researchers how to search important journals and they manage the collections and access to the collections. Of late Librarians manage the raw data

generated by researchers through their institutional repositories. Public libraries have been pivotal in supporting adult literacy programmes and education for all initiatives.

Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. A digital literate person should have computer literacy to operate computers computerised gadgets, visual literacy to understand multimedia sources, network literacy to use e-mail and social media to form networks and to communicate with others and the ability to create digital content. At Nust digital literacy is administered through the use of student and staff web mails as well as the google classroom.

4

The Long Term Solution to Energy Problems in Zimbabwe Lies in Nuclear Energy

NAME: Dr P Baricholo

EPARTMENT: Applied Physics

Zimbabwe has been facing power challenges over the years as a result of its dependency on two main energy supplies which are the Hydro Electric Power and the Thermal Power. These power plants have outlived their lifespan and most of the time are operating at below installed capacity. Zimbabwe's electrical power demands is about 3 GW. Continuous breakdown of Hwange and inadequate water supply in Kariba dam have further reduced the energy generated by these two power plants. Regional power companies can no longer assist Zimbabwe to meet its energy demands as they are also failing to adequately provide this high demand resource, to their local markets. This has resulted in extended load shedding country wide. To mitigate against load shedding, many people have started using either diesel generators or solar energy for lighting and gas for their cooking requirements. The poor and vulnerable groups, have resorted to firewood and this has seen an increased deforestation of areas close to most cities and urban centers. Use of diesel generators is unsustainable for most businesses and households as the cost of diesel used by the generator is also very high. A number of businesses no longer have a choice but to send their workers home whenever there is load shedding. This has a negative effect to the economy as a whole.

Installing solar energy at business and household level is currently beyond the reach of many. For those who afford it, a strict battery charge and discharge monitoring system must be followed as any total discharge or overcharging of the batteries could damage it resulting in a more frequent battery replacement. Batteries used with solar systems are also on the expensive side as these are mostly imported into Zimbabwe.

Solar panels on the other hand, are not yet as efficient as expected but are still expensive hence the cost of installing solar systems is beyond the reach of many. The solution is that houses should not be solely dependent on solar energy but should consider using solar for light power consuming gadgets and electricity for gadgets that are more energy demanding. To overcome this, Zimbabwe should try to produce its own solar equipment in order to reduce installation costs. In my view, solar energy is not the solution as far as meeting national energy demands. Solar could be a short term solution whilst the country is working on a long term solution for the country's energy requirements..

Wind energy could also be viewed as an alternative energy source in some sections. However, to generate meaningfully from wind farms, wind speeds of about 5 m/s are required. Not many places in Zimbabwe have winds of this speed. Probably this could be implemented in the Eastern Highlands around Chimanimani area. Otherwise the rest of the country would not generate usable wind energy.

Industrialization and the increase in urban population growth are the drivers of the high rate of power consumption country wide. Any country's economic growth is made possible by adequate energy supplies to industry. This is not the case in Zimbabwe and the Government's vision 2020 would remain a pie in the sky if the energy issue is not resolved. In my view, Government and the Nation as a whole must start planning for the increased future energy demands if middle income status is achieved. Not planning for the future is what has pushed us into the prevailing situation. Assuming by 2030, Zimbabwe would be a middle income economy, our energy demand would increase as more people would be living in urban areas and there will be more industries in operation at an increased capacity utilisation. Currently installed capacities at our power plants and even with an accelerated expansion programme, the energy demand would not be satisfied from local production.

In the medium term, pressure by International Community would force us to stop using thermal power, as already there are indications that green energy is the energy for the future. On the other hand, climate change has dwindled the amount of rainfall received in Southern Africa and hence hydro power generation will more frequently fail to generate electricity at installed capacities. The current problems at Kariba will be more frequent as global warming takes its toll on our climate.

Hydro Electric Power has been suffering from our erratic season because of climatic change water levels in Kariba are lowering up. Thermal power has been the main contributor to climatic changes because it has been contributing to the carbon footprint. However, we should go green as a nation and go nuclear. Therefore, if Zimbabwe adopts the use of nuclear and uses the uranium it is endowed with, it could improve the economy's status because if the project is successful it can be able to support the SADC region which will boost the economic growth in the long run.

I am of the opinion that, the answer to our energy problems lies in Nuclear energy. In simple terms, in a nuclear power plant, nuclear fission generates heat which is used to heat boilers resulting in steam production. Steam produced, is used to drive turbines that would result in the generation of electricity. This done at a nuclear power plant which has an installed nuclear reactor. Generation of nuclear energy requires a broad skills base hence the need to plan the project for over 20+ years before it is fully implemented. However, once established, nuclear power plants have a long lifespan compared to other power plants and has a number of advantages. Their major drawback of this technology, is the storage of radioactive waste, which in my opinion is something which requires proper planning.

Installation of a Nuclear power plant by Zimbabwe would not happen in our lifetime but this is a legacy, current generation could leave behind. Zimbabwe should start planning for this now. Manpower to operate such facilities should start training now. If as a country we are not able to implement it, then we could lobby the SADC region to start planning for this. Already Zambia and South Africa are looking at this more seriously. It is now that as a country we should be a partner in the construction of these power plants so that in future we will not be saddled with a large electricity import bill.

The first step towards establishment of a nuclear reactor is the installation of a Research Reactor. Apart from manpower development, such a reactor could be used to produce radioisotopes that are currently being imported for use in cancer treatment. With increased and improved quality of skills base, such a reactor could also be used for radioisotope production that could be exported.

Most people fear nuclear because of its outrageous drawbacks of nuclear explosions such as the Fukushima disaster, despite that drawback Dr Baricholo elaborated further on how nuclear could be used safely. He said, waste disposal could be done using land as radioactive waste could be buried in land as our nation is endowed with land. This land should be dug underground and protected from people. The country will also have to abide to the rules that were drafted by the International Energy Agency (IEA) in order to keep everybody safe. Furthermore, manpower should be identified and be sent to be trained abroad on how to safely use, run and dispose nuclear matter.

Rehabilitation of Umguza River and Removal of Water Hyacinth.

The researchers from the National University of Science and Technology (NUST) in the department of Civil and Water Engineering, Applied Chemistry, Bio Technology and the Research and Innovation Office (RIO) are working collaboratively with EMA, BCC and the Ministry of Lands and Agriculture on a project to remove water waste and reduce water pollution in the environment. They have 4 main objectives which are:

- **To identify pollutants, the sources as well as monitoring strategies.**
- **To develop water quality monitoring strategies for Umguza river.**
- **Implement appropriate rehabilitation as well as restoration measures for the Umguza river.**
- **Strengthen Institutional capacity for catchment management.**

The project has just commenced therefore it is currently on the first stage. The researchers at Nust and EMA are working on identifying the possible sources that are responsible for polluting water as well as the types of pollutants. This will consist of monitoring streams from the CBD such as Matsheumhlope and Mazai river leading all the way to Umguza river. In order to identify where the majority of the pollutants come from.

R

I

O

Coming Up in the Month of October

* The International Day for the Universal Access to Information
* International day of non violence
* Day of the Girl Child
* United Nations Day

Sincere apologies for the discontinuation of the newsletter. It will be issued on a monthly basis keep your self updated with the current research activities at Nust.