

HIT NEW CHANCELLOR



H.E Cde E.D. Mnangagwa
HIT Chancellor

Following the inauguration of the Second President of the Republic of Zimbabwe, His Excellency Cde E.D. Mnangagwa, the Board Chairman, Dr Gibson Mandishona has the pleasure of announcing that HIT now has a new Chancellor.

His Excellency, Cde E.D. Mnangagwa becomes the second Chancellor of HIT since its establishment in 2005. He will be officially installed at a date to be announced.

HIT is indeed humbled to be led by a visionary leader and icon.

NEW APPOINTMENTS IN HIGHER AND TERTIARY EDUCATION SECTOR

Following his inauguration as the Second President of the Republic of Zimbabwe, His Excellency Cde E.D. Mnangagwa announced his new cabinet, appointing Prof. Amon Murwira as the new Minister of Higher and Tertiary Education, Science and Technology Development.

Prior to his appointment, Prof. Amon Murwira was the Chairman and a lecturer in the Department of Geography and Environmental Science at the University of

Zimbabwe. He was also an ecologist in the Department of Natural Resources at the Ministry of Environment and Tourism Zimbabwe.

Dr. Desire Sibanda was reassigned, and is now the new Permanent Secretary for Higher and Tertiary Education, Science and Technology Development. Prior his reassignment, Dr. Sibanda was the Permanent Secretary Youth Development, Indigenisation and Economic



Professor A. Murwira
Minister of Higher and Tertiary Education,
Science and Technology Development



Dr D. Sibanda
Permanent Secretary
Ministry of Higher and Tertiary Education,
Science and Technology Development

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INNOVATION

LEADERSHIP

INTEGRITY

COMMITMENT

PROFESSIONALISM



Harare
Institute of
Technology

success through innovation

CONGRATULATORY MESSAGE



His Excellency, President of the Republic of Zimbabwe
Cde E.D Mnangagwa

The Board Chairman Dr G. Mandishona and the entire Institute Board, the Vice Chancellor, Eng. Q.C. Kanhukamwe, the Staff and Students of the Harare Institute of Technology congratulate His Excellency Cde E.D Mnangagwa on his appointment as the President of the Republic of Zimbabwe and First Secretary of the Revolutionary Party, ZANU PF.

On this auspicious occasion, we join the rest of the nation as we revel in the unveiling of a new epoch that promises a glorious and great Zimbabwe- as we collectively work to restore vibrancy in our agriculture, industry and commerce as well as the mining sector.

Your Excellency, we salute your time honoured principles and values of tenacity, dedication, selflessness, loyalty, fortitude and unhu/ubuntu exhibited during our liberation struggle and after independence as well as your offering of servant leadership to the people of Zimbabwe.

We also applaud the ushering in of an era where corruption, incompetency, dereliction of duty, laziness, social and cultural decadency will not be tolerated.

As HIT, we fully commit ourselves to this new national development thrust being ever cognisant of the mandate conferred upon us; technology development, incubation, transfer and commercialisation for Zimbabwe's rapid industrialisation and technological advancement.

Long Live Zimbabwe!

Congratulations, Makorokoto, Amhlope!!!

CONGRATULATORY MESSAGE



Professor A. Murwira
Minister of Higher and Tertiary Education,
Science and Technology Development

The Board Chairman Dr G. Mandishona and the HIT Board, the Vice Chancellor, Eng. Q.C. Kanhukamwe, Senate, Management, Staff and Students wish to convey sincere congratulations to Honourable Professor Amon Murwira on his appointment as Minister of Higher and Tertiary Education, Science and Technology Development.

Given your commitment and outstanding contribution to higher education as an academic and administrator, we are quite confident that you will steer the higher and tertiary education, science and technology sector to even greater heights.

The Harare Institute of Technology wishes you the best in your new portfolio as you take leadership of the Ministry of Higher and Tertiary Education, Science and Technology Development.

Congratulations, Makorokoto, Amhlope!!!



CONGRATULATORY MESSAGE



Dr D. Sibanda
Permanent Secretary

Ministry of Higher and Tertiary Education,
Science and Technology Development

The Board Chairman, Dr G. Mandishona, the Vice Chancellor, Eng. Q.C. Kanhukamwe, the Staff and Students of the Harare Institute of Technology congratulate you on your appointment as Permanent Secretary for the Ministry of Higher and Tertiary Education, Science and Technology Development.

A distinguished public servant and seasoned administrator, we look forward to your leadership and guidance.

Congratulations, Makorokoto, Amhlope!!!

HIT STUDENTS SHINE AT INAUGURAL TELONE COMPETITIONS



Electronics Engineering students showcasing and demonstrating their Uninterrupted Power Supply (UPS) devices during TelOne ASDL and GPON modems design and implementation competition.

Twelve students from the Electronics Engineering department participated in a competition on the design and implementation of Uninterrupted Power Supply (UPS) devices for TelOne ASDL and GPON modems, with the winners walking away with a USD 2000 prize.

Lesley Paradza, Kudakwashe Kagoro and Henry Chireshe emerged winners after their UPS prototype device was declared the best project with 1041 points. Group 2 came up second with 1019 points, Group 1 was third with 931 points whilst Group 4 was fourth with 931 points. Each group consisted of 3 students, while the panel of judges was comprised of engineers, innovation and business development analysts from HIT and TelOne. As from June 2017, the students were required to design a reliable, usable and alternative energy powered Uninterrupted Power Supply (UPS) device for a modem with a minimum autonomy of not less than 5 hours. This programme covered issues of technology development, innovation, technopreneurship, import substitution and empowerment.

The competitions were held on 12 December 2017 at HIT, and each group was required to make a 10 minute oral presentation describing and selling their device; with another 10 minute demonstration of its functionality and properties.

In his introductory remarks, the Chairman of the Electronic Engineering department, Engineer Charles Kanyunga said the programme was spearheaded and funded by TelOne in an effort to provide solutions to power supply problems currently affecting the telecommunications sector in Zimbabwe.

Telone Innovations Executive Eng. Mnembi commended HIT for its work in technology

development and innovations, adding that TelOne appreciates and values the collaboration. "We want to do a lot more together and we promise to continue working together, as well as seeking new ways and projects which improve our services to the nation and which make our country better. We want also intend to come back with more challenging projects for the students, as well increase the number of HIT students for the TelOne internship programme," he said.

Speaking at the same occasion, Dean in the School of Engineering and Technology Eng. Perkins Muredzi also commended the collaboration between HIT and TelOne saying the competition was fulfilling and exciting. "I therefore would like to express HIT's gratitude and appreciation for the sponsorship given that TelOne, HIT staff and students are involved in this project. Our students are exhibiting great innovations in coming with technologies that are beneficial to our country," he said.

Dean Muredzi added that the project demonstrates the operationalisation of the research and development thrust of the HIT and TelOne Memorandum of Understanding, signed on 9 April 2017. "Several projects are lined up and we are looking forward to conducting more beneficial research and development projects that will lead to intellectual property outputs which are beneficial to both parties. At the core of

collaboration is innovation and technology optimisation and excellence in technological work that benefits the entire Zimbabwean populace," he said.

The event was graced by Vice Chancellor, Eng. Q.C Kanhukamwe, Pro-Vice Chancellor Dr. M. Chanakira, HIT and TelOne Senior Management, as well as HIT staff and students.

The Harare Institute of Technology entered into a Memorandum of Understanding with telecommunications company, Tel One on 9 April 2017. The MoU is centred on collaboration on information and communication technology (ICT) related innovations, research and commercialisation activities. The purpose of the MOU is to establish a framework for innovative collaboration between the two parties through the development and commercialisation of technology relevant to TelOne as an Information and Communication Technology operator.

The MoU also seeks to further the provision of relevant real world industry experience for students, building-up of integrated solution ecosystem which addresses business needs, furthering the science involved in ICT telecommunications as well as furthering Corporate Social Responsibility through mentorship of the next generation of technopreneurs.



Winners of the TelOne ASDL and GPON modems Uninterrupted Power Supply (UPS) devices design and implementation competition pose for a photograph with some TelOne and HIT staff.

PHARMACY DEPARTMENT HOSTS INAUGURAL PROFESSIONAL SKILLS COMPETITION



The inaugural Professionals Skills Competition to rate pharmacy students' aptitudinal skills was held at the Harare Institute of Technology, under the auspices of the Zimbabwe Pharmaceutical Students Association (ZPSA) on 13 November 2017.

The competition had three categories: clinical skills, patient counselling and compounding. The clinical skills competition was aimed at generating interest amongst pharmacy students in the field of clinical pharmacy, testing their knowledge on pharmacology, therapeutics, physiology and pathology. The test is also aimed at encouraging students to explore clinical pharmacy as a career path. The patient counselling category was aimed

at equipping students with patient counselling skills, and improving their confidence and eloquency in speech. The compounding category challenged students to determine the best method to compound the formulation and preparation of finished products.

The competition provided students with opportunities available in various fields of pharmaceutical technology. An introductory workshop was held with experts from the pharmaceutical industry. Managing Director of Pharmanova. Mr D. Moyo, addressed students on compounding skills; while Ms M.Rozna of Kenlink Pharmacies conducted a presentation on patient counselling skills. Mrs M. Penduka, a Lecturer from the UZ

School of Pharmacy presented on clinical skills, while Mr L. Bhunu, Pharmacist in Charge at Public Service Medical Aid Society (PSMAS) talked about entrepreneurship and pharmacy. Professor Maponga, former Director of the UZ School of Pharmacy and Clinical trials explored the opportunities available in Clinical Pharmacy while a representative from Varichem also discussed opportunities available in the manufacturing sector.

The event was organised by the Zimbabwe Pharmacy Students Association and was attended by students from Harare Institute of Technology, University of Zimbabwe and the Harare Polytechnic.

WHITE COAT CEREMONY



First year Pharmacy students from the Harare Institute of Technology and University of Zimbabwe attended the White Coat ceremony at Parirenyatwa Hospital under the Zimbabwe Pharmaceutical

Students Association.

The White Coat ceremony was intended to welcome the new students into the pharmacy profession as well as reinforcing the oath of

values that they should uphold and preserve in their course as a pharmacist. The students pledged their commitment to the pharmacist's oath donned in their white lab-coats donated by the Medicines Control Authority of Zimbabwe (MCAZ).

The ceremony started at 0900hrs with welcoming remarks by the ZPSA President Tanaka Gutu who introduced the national committee and the HIT committee. The event was graced by the university of Zimbabwe's Dean of Health Sciences, Vice President of Pharmacy Society of Zimbabwe (PSZ), a representative of (MCAZ) and lecturers from HIT and UZ.

HIT PARTICIPATES IN BIOCHEMISTRY AND MOLECULAR BIOLOGY INTERNATIONAL SYMPOSIUM

The department of Pharmaceutical Technology participated at a two-day Biochemistry and Molecular Biology International Symposium held from 14-15 November 2017 at the Holiday Inn Hotel in Harare, under the theme "Applications of Biochemistry in Everyday Life."

Ms. Winnet Chipato from the department of Pharmaceutical Technology and two recent graduates, Mr Lewis Mutevera and Ms Rumbidzai Mberi presented papers on the potential applications of ethnobotany in health and disease; while another presentation explored the potential use of mushroom (*Pleurotus ostreatus*), peanuts (*Arachis hypogaea*) and sorghum (*Sorghum vulgare*) in a nutraceutical formulation for the treatment and prevention of pellagra. Pellagra arises from the lack of Vitamin B3 (niacin) and is one of the most prevalent malnutrition diseases affecting children in developing countries.

The second presentation was a preliminary study investigating the use of the fig, *Ficus capensis* in the treatment of peptic ulcer disease. Most current anti-ulcer drugs have numerous adverse effects including thrombocytopenia, nephrotoxicity and hepatotoxicity; hence the need for alternative medicines. The ethanolic leaf extract of *Ficus capensis* exhibited significant ulcer healing activity in a rat model. The preliminary phytochemical screening indicated the presence of alkaloids, glycosides, saponins, tannins and flavonoids. This could be the future for a safer and more effective regimen of peptic ulcer disease.

The symposium was organised by the Biochemistry and Molecular Biology Society of Zimbabwe (BMBSZ), to which HIT is an affiliate, and was hosted in conjunction with the Federation of African Societies of Biochemistry and Molecular Biology

(FASBMB).

Other participants were drawn from Morocco, Nigeria, Botswana, South Africa, the United Kingdom, - the Zimbabwe Academy of Sciences (ZAS), the African Institute of Biomedical Science and Technology (AiBST), Allergy and Immunology Clinic, Chinhoyi University of Technology (CUT), Midlands State University (MSU), Harare Polytechnic, the Scientific and Industrial Research and Development Centre (SIRDC) and the University of Zimbabwe (UZ).

Professor Iqbal Parker, from the University of Cape Town gave an insight into his current work in the molecular biology and genetics of oesophageal cancer, while Professor Khalid Fares from Cadi Ayyad University-Marrakech, Morocco, spoke on the need to recycle organic waste for sustainable agriculture.

FORMULATION OF A NUTRACEUTICAL INSTANT POWDERED MEAL USING PLEUROTUS OSTREATUS, ARACHIS HYPOGAEA AND SORGHUM VULGARE FOR THE PREVENTION AND TREATMENT OF PELLAGRA

Mberi R., Chipato W.E., Katsande D.

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Nutraceuticals and functional foods have received considerable interest in research because of their potential nutritional and therapeutic effects as well as their presumed safety. In this study, an instant nutraceutical powdered meal was formulated using *Pleurotus ostreatus*, *Arachis hypogaea* and *Sorghum vulgare* for the treatment and prevention of pellagra, which is one of the most prevalent malnutrition diseases in children in developing countries including Zimbabwe. Pellagra arises from the lack of Vitamin B3 (niacin). The plants selected for formulation are locally available, drought resistant, have a high yield turn over and a high Vitamin B3 content. A nutritional profile of the formulation indicated that it had 45.73% Vitamin B3, 16.26% Vitamin B2, 20.31% Vitamin B1, 25.79% Vitamin B5, 21.43% Vitamin B6, 15.6% protein, 65.28% carbohydrates and 381 kCal of energy. Therefore one serving of the instant meal can be taken per day for prevention, and two servings per day for treatment of pellagra. The product was free of pathogenic and spoilage microbes.

KEY WORDS: Vitamin B3 (niacin), pellagra, nutraceutical, *Pleurotus ostreatus*, *Arachis hypogaea*, *Sorghum vulgare*

INVESTIGATION OF THE ANTI-ULCER ACTIVITY OF FICUS CAPENSIS ON MALE ALBINO RATS

Mutevera L. F., Chipato W. E., Mawoza T., Matowa P.

Peptic ulcer disease is a condition characterised by a breach in the gastro-intestinal mucosa, typically in the stomach or first few centimetres of the duodenum, which penetrates through the muscularis mucosae. Most current anti-ulcer drugs have numerous adverse effects including thrombocytopenia, nephrotoxicity and hepatotoxicity; hence the need for alternative medicines. The anti-ulcer activity of the ethanolic extract of the leaves of *Ficus capensis* was investigated in male albino rats using a 0.15M hydrochloric acid in 70% ethanol ulcer induced model. The standard drug ranitidine (150mg/kg) was used as the positive control. The ethanolic extract was evaluated for the presence of phytochemicals using standard methods. The macroscopic ulcer index was used to assess the anti-ulcer activity of the plant extract. The results showed that the extract exhibited significant ($p < 0.05$) ulcer healing activity which was dose dependent. The percentage ulcer healing which was determined as the curative ratio of the plant extract at 100mg/kg and 150mg/kg was 42.10% and 73.68% respectively. The preliminary phytochemical screening indicated the presence of alkaloids, glycosides, saponins, tannins and flavonoids.

KEY WORDS: peptic ulcer, anti-ulcer, *Ficus capensis*, phytochemicals, curative ratio

ZIM NANOTECHNOLOGY RESEARCHERS PRESENT CUTTING-EDGE PAPERS AT INTERNATIONAL CONFERENCE



The Zimbabwean nanotechnology researchers who attended the 9th International Conference of the African Materials Research Society (AMRS) 2017 in Gaborone, Botswana from 11-14 December 2017.

A team of Zimbabwean nanotechnology researchers led by Mr Tatenda Madzokere, a lecturer from the Department of Chemical and Process Systems Engineering attended and presented cutting-edge research papers at the 9th International Conference of the African Materials Research Society (AMRS) 2017 in Gaborone, Botswana from 11-14 December 2017.

Nine students and three lecturers from HIT, where among the twenty-five Nanotechnology researchers from Zimbabwe who made their mark at the conference, whose main purpose was to stimulate nanoscience and nanotechnology research amongst young researchers.

Undergraduate students from Zimbabwe amazed most delegates with their articulate presentations in their research work. Zimbabwe was the only country with undergraduate students who showcased their research work. All research papers presented will be published in the High Impact Factor Journal, MRS Advances, published jointly by the Materials Research Society and Cambridge University Press.

Madzokere said Nanotechnology has the potential to transform every sector of the Zimbabwean economy if fully embraced. He added that it can benefit many areas such as mineral processing, agriculture, water treatment, defence and security, manufacturing, among others. "This technology presents a huge opportunity for value addition of the country's raw material into finished goods. However, there is need for the nation to set up a fully-fledged National Nanotechnology Centre, if the country is to benefit from this emerging technology", he said.

The conference kicked off with a two day preconference workshop held at the Botswana Institute for Innovation and Research (BITRI), and a four day main conference at the Gaborone International Conference Centre. The conference was graced by a Nobel Laureate, Prof. Jean-Marie Lehn who was the Plenary Speaker. The preconference workshop provided delegates with an opportunity of hands-on exposure to backbone equipment such as Scanning Electron Microscopy, Energy Dispersive Spectroscopy, Powder X-ray Diffractometer, Electrospinning Unit (Nanospider) required for effective nanotechnology research

The conference was held under the theme: "Addressing Africa's Challenges through Nanomaterials Development," and was aimed at creating a platform for collaboration to promote research efforts focused on manipulating materials at the nanoscale in order to:

- value to Africa's abundant natural resources;
- solve Africa's problems through materials science research by developing superior nanoscale materials;
- and to create an innovative environment through a fundamental understanding of nanoscience/nanotechnology.

The international conference was attended by more than 550 delegates from 65 countries across the globe, and provided an opportunity for faculties and students to network with experts in nanotech research. Amongst the delegates were academics, industrialists, policymakers and students.

His Honour, the Vice President of the Republic of Botswana Mr. Mokgweetsi Masisi officially opened the conference.

The keynote speakers included Professor Jean-Marie Lehn, a Chemistry Nobel Prize winner, (1987) who presented on "Dynamic Materials towards Functional Adaptive". Other keynote speakers and Plenary Session speakers included Donald Cram and Charles J. Pedersen, the founding BITRI Chief Executive Officer and current Executive Director of the African Academy of Sciences Governing Council, Professor Nelson Torto, and other acclaimed scientists such as Prof Paul S. Weiss, Prof Sossina Haile, as well as Prof Tobin J. Marks and who chaired various plenary discussions under different sub-themes.

The conference ran some parallel sessions under various topics that include Materials for Health, Materials for Water, Materials for Agriculture/Environment, Materials for Energy, Materials for Mining/Construction, Nanoscience/Nanotechnology, Materials for Education/Networking and Computational Materials Science. These topics reflect both the needs of the global research community such as energy and health, as well as the needs that are specific to Africa.

Madzokere expressed his gratitude to the Ministry of Higher and Tertiary Education, Science and Technology Development, the Botswana Institute for Technology and Innovation (BITRI) and Southern and Eastern Africa Network of Analytical Chemists (SEANAC) for their support.

VISIT TO ZIMBABWE CENTRE FOR HIGH PERFORMANCE COMPUTING (ZCHPC)



Students and staff from the School of Information Science and Technology visiting the High Performance Computing Centre (ZHPC) at the University of Zimbabwe

Students and staff from the School of Information Science and Technology toured the High Performance Computing Centre (ZHPC) at the University of Zimbabwe on 3 November 2017 to explore the facility and assess how it would benefit them in the development of complex algorithms and to seek the granting of access to use this facility in the preparation of their Capstone Final Year Projects.

The Zimbabwe High Performance Computing Project was conceived in October 2011 and is one of the key solutions to assisting the nation and the Southern African Development Community (SADC) region in solving the current climate change, food security, fresh water, poverty, disease, energy and human capital development problems through advanced research. It was commissioned on the 6 February 2015. The Project was instigated under the ZIMASSET national flagship programme under the e-Governance cluster.

High Performance Computing generally refers to a practice of aggregating computing power in an approach that delivers much higher performance than one could attain out of a typical desktop computer or workstation to solve complex problems in science, engineering, weather forecasting, simulations, or any field of concern. High Performance Computing (HPC) uses super computers and parallel processing techniques for solving complex computational problems. HPC technology focuses on developing parallel processing algorithms and systems by incorporating both administrative and parallel computational techniques. High-Performance

Computing is typically used for solving advanced problems and performing research activities through computer modelling, simulation and analysis. HPC systems can deliver sustained performance through the concurrent use of computing resources.

High Performance Computing (HPC) evolved as a result of increasing demands for processing speed. It brings together several technologies such as computer architecture, algorithms, programmes, electronics and system software under a single canopy to solve advanced problems effectively and quickly. A highly efficient HPC system requires a high-bandwidth, low-latency network to connect multiple nodes and clusters.

HPC technology is implemented in multidisciplinary areas such as information technology, information security, computer sciences, financial modelling, biosciences, geographical data, oil and gas industry modelling, electronic design automation, climate modelling, media and entertainment. The most common users of HPC systems are scientific researchers, engineers and academic institutions. Some government agencies, particularly the military, also rely on HPC for complex applications. High-performance systems often use custom-made components in addition to so-called commodity components. As demand for processing power and speed grows, HPC will likely interest businesses of all sizes, particularly for transaction processing and data warehouses.

Other users of the HPC are the Metrological

Services Department Zimbabwe (MSDZ) in global numerical weather and climate forecasts through advanced computer observation and analytical modelling techniques and tools. The comprehensive earth-system models developed by HPC Applications creates the basis for all the data assimilation and forecasting activities. The HPC is producing practical results as the MSDZ is currently running WRF, an application for weather forecasting. The processing power has enhanced the service delivery in terms of weather updates for the nation and region. During this pilot phase, the time for results to be produced has drastically been reduced by 96.6% as what used to take approximately 30 hours now takes far less than an hour. The power of supercomputing has also been realised in life sciences.

The African Institute of Biomedical Science and Technology (AiBST) is also utilizing the national HPC in its DNA Forensic and Bioinformatics analysis and in the development process of specialised medicines and the phylogenetic analysis of HIV variance isolated from Zimbabwean people.

The High Performance Computing (HPC) Centre is also currently in the process of connecting all state universities and the academia for advanced research in various scientific, engineering and technological areas in higher learning institutions. It also has a provision for individual users who lack resources to connect to the cluster remotely. These users can come directly to the Centre and fully utilise the Cluster via installed terminals.

THE YEAR IN RETROSPECT (PICTURES)

