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ACE II NEWSLETTER

Africa Centers of Excellence role in the pandemic response

CS-OGET Purchases Drilling Simulation Infrastructure

IUCEA Celebrates Golden Jubilee

WISE-Futures in student and staff Exchange Programme with Indian Institutes of Technology

In search for solutions to sustainable leather production

Grid Innovation & Incubation Hub welcomes incubatees

Contents

ACE II Newsletter, December 2020

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CS-OGET Purchases Drilling Simulation Infrastructure

The Center of Studies for Oil and Gas Engineering and Technology (CSOGET) based at Eduardo Mondlane University in Mozambique recently acquired a drilling system simulator DrillSIM 5. This System is based on a computational infrastructure composed of three giant screens, two for viewing various scenarios in drilling environments and a smart one for controlling operations. The system was installed in a mini-server called an instructor PC and a graphic computer that manages the entire system. Eight desktop computers for the trainees are part of this simulation system connected through wired designed LAN.

The DrillSIM 5 (Educator) is a software-based simulator that delivers a wide range of real-time drilling and well-control simulations. The software displays interactive on-screen versions of the control panels present in simulator hardware to ensure a realistic experience that provides the end user with proven reliability and confidence. The training follows accreditation standards set by International Well Control Forum (IWCF) and International Association of Drilling Contractors (IADC).

The training packages offered by CS-OGET comprise all levels of expertise for candidates without basic knowledge of drilling and well-control to professionals who need to refresh in the latest technology in use by the oil and gas industry.

This simulator will provide opportunities for the Oil and Gas sector across the country and region to prepare their staff at different levels. CSOGET has prepared a series of training courses with varying levels (DrillSIM Lite, DrillSIM Educator, DrillSIM Plus and DrillSIM Professional) that will be taught to managers, technicians and the academic sector in Oil and Gas areas.

A 3-week drilling and operation training course ran from January 20, 2020. It was conducted by a renowned industry expert, Mark Venettozz. The course was a training of trainers for a small group of future trainers (Professors, Researchers and Technicians) to manage the drilling system simulator. The simulator was acquired from Drilling System Company in England, one of the largest global suppliers of drilling simulators.

ACEIDHA commits $200,000 to national COVID-19 efforts

The Africa Centre of Excellence for Infectious Diseases of Humans and Animals (ACEIDHA), based at the University of Zambia, has committed USD 200,000 to support the national COVID-19 efforts aimed at mitigating the disease.

Students get ready for surveillance of infectious diseases in bats at Leopards Hill caves in Chongwe district of Lusaka province

The Africa Centre of Excellence for Infectious Diseases of Humans and Animals (ACEIDHA), based at the University of Zambia, has committed USD 200,000 to support the national COVID-19 efforts aimed at mitigating the disease. This was announced by the University of Zambia Vice Chancellor, Prof. Luke Evuta Mumba, on 21st April 2020, at a press briefing by the Minister of Health, Dr. Chitalu Chilufya.

The money was a grant to ACEIDHA by the Skoll Foundation through the SACIDS Foundation for One Health. The grant will support COVID-19 surveillance and diagnostics. ACEIDHA will use part of the money to support the Zambia National Public Health Institute, conduct event based surveillance (EBS) in five points of entry (POE) districts using mobile technologies.

According to the deputy center leader ACEIDHA, Prof Martin Simuunza, part of the surveillance budget was used to procure mobile phones for use in the five points of entry districts, namely, Chililabombwe (border with DR Congo), Chirundu (border with Zimbabwe), Lusaka (capital city and COVID-19 epicentre), Kazungula (border with Namibia) and Nakonde (border with Tanzania).

The funds also supported training of district epidemic preparedness committee members (DEPC) and community based volunteers. It is hoped that setting up of the EBS will enable the capture of COVID -19 disease events in real time and also assist with contact tracing. The remaining amount of money will be used to buy laboratory reagents and materials, in-country coordination and monitoring and evaluation.

https://aceidha.unza.zm/ AceidhaZ

IUCEA Celebrates Golden Jubilee

This year, 2020, marks 50 years of the existence of the Inter-University Council for East Africa (IUCEA). IUCEA is an institution of the East African Community (EAC) responsible for the development and coordination of higher education and research in the East African Community region.

In June 1963, the University of East Africa was established. The University was formed out of three colleges - Makerere College (Uganda), Royal College (Kenya) and University College of Dar es Salaam (Tanzania) which were then singularly colleges of the University of London.

In 1970, the University of East Africa was dissolved and autonomous universities were established – Makerere University, University of Nairobi and the University of Dar es Salaam. The stakeholders in higher education in the region agreed to establish the Inter-University Committee (IUC) in 1970 to allow the three universities to continue with academic collaboration.

After the break-up of the former EAC (1967 -1977), the three universities resolved to co-operate and IUC continued with its coordination role until 1980 when a MoU was signed between the three universities and transformed the IUC into the Inter-University Council for East Africa

Following the Treaty that established the EAC in 1999, IUCEA was recognised as one of the surviving institutions of the former EAC and in 2002 the Partner States agreed to establish a corporate body to be known as the Inter-University Council for East Africa, through the IUCEA Protocol 2002.

The Golden Jubilee celebrations saluted the achievements made through this journey of cooperation and development of higher education in East Africa and beyond. It is an opportunity for higher education stakeholders to plan together on the future direction of IUCEA and higher education in general. IUCEA hosted a series of webinars on the role of higher education in the transformation of society.

The final celebrations were held on November 24th 2020 at a hybrid event with a few guests in Entebbe, Uganda and many others online.

WISE-Futures in student and staff Exchange Programme with Indian Institutes of Technology

On March 11, 2019, the World Bank and the Department of Science and Technology India exchanged a MOU to implement activities related to strengthening Africa Centers of Excellence (ACEs).

The details of this project can be found here https://www.iitr.ac.in/dstai/. The key activities to be implemented within two years include:

PhD students to spend up to six months in Indian Institutes of Technology (IIT) for research per year.

MSc students to spend up to six months in a year at IIT.

Faculty from ACEs to spend a month in a year at IIT.

IIT faculty can spend maximum of 14 days in a year.

Workshops/seminars.

In Tanzania only WISE-Futures ACE is participating in this program. Wise Future is collaborating with IIT Roorkee (IITR) and IIT Delhi (IITD) in the field of water infrastructure and environment management.

In 2020, four faculty members and five students from NM-AIST were scheduled to participate in this program at IITR and IITD. However, only two students, Mr. Mohammed Mwabumba (PhD student) and Ms. Mercy Kundu (MSc. Student under ACE scholarship) were able to travel to IITD and IITR for their exchange program. The remaining three students and faculty could not travel due to COVID-19 travel restrictions.

Mohammed Mwabumba is a Tanzanian PhD student specializing in Hydrology and Water Resources Engineering. He is working on research titled Hydrological response of water ecosystems to climate change and land cover/use changes dynamic in Ngorongoro conservation area and surrounding Northern Tanzania. In his study, Mr. Mwabumba aims at performing scenario analysis to analyse the hydrological response of water ecosystems to climate change and land use/cover change.

The results will inform state and non-state actors on the sustainability of water ecosystems in the wildlife hotspot areas of Ngorongoro Conservation area and surroundings.

Mwabumba was at Indian IITR for six months from January 2020 to June 2020. He performed his research activities at the hydrology department of IITR until March when the Indian Government introduced a lockdown due to the COVID-19 pandemic. During the lockdown, he worked from the hostel and worked virtually with other colleagues and his supervisor. He said the lockdown was stressful but it gave him some quiet time to concentrate on his research work. "Despite COVID-19 I managed to complete two manuscripts and submit them to a journal for publication," he said.

He also analysed data for two more manuscripts which he expects to submit for publication by the end of 2020. He plans to submit his dissertation before the end of December 2020. Mr. Mwabumba appreciates the collaboration between WISE-Futures and IITR because it has helped him to accomplish a notable milestone in data analysis and space for uninterrupted writing.

ACE in Data Science attains international accreditation of its programs

University of Rwanda(UR) is now poised to earn another premier accreditation from the Data Science Council of America (DASCA) – the global giant in data science standards and credentialing. Notably, the UR's African Center of Excellence in Data Science (ACE-DS) is Africa's first institution to be earning the prestigious DASCA accreditation.

The ACE-DS Director, Dr. Charles Ruranga, is confident that this will propel this World Bank-funded Center of Excellence in Data Science further ahead of the curve in Data Science learning and research in Africa. "The clincher is that we'll now deploy curricula and content that's aligned to the world's most advanced standards to prepare data science talent that addresses the talent needs of the entire African industry, and not just Rwandans," says Dr. Ruranga.

DASCA accreditation comes on the back of the UR's College of Business & Economics (CBE) becoming an Authorized Education Provider of DASCA, and gives ACE-DS the capability to offer world-class Master's and PhD programs in frontier areas of Data Science. With the CBE adding the capability to offer DASCA certifications in big data analytics and big data engineering to undergraduate and postgraduate students, the University of Rwanda has developed a robust data science education and research ecosystem which can offer the widest range of academic, professional and executive programs in Data Science to all types of learners.

With the accreditation, ACE-DS also gets to implement vendor-neutral curricula with cross-platform coverage and treatment of data science tools and techniques. "We need our students to be versatile across platforms and agile to emerging technologies. That's only possible if we graduate to a curricular structure that is advanced and yet generic in its core on the one hand, and on the other, covers all platforms and tools in practice today and those on the horizon," said Dr. Ruranga.

The DASCA accreditation is also expected to push up the global visibility of ACE-DS and the University of Rwanda as capable Data Science educators. DASCA accreditation will help to accelerate the creation of a data science talent pool of senior professionals who can lead data science projects and help organizations in Rwanda and across Africa implement world-class analytics in business and governance.

In search for solutions to sustainable leather production

Research topic: Development of organic tanning agent from local plants for processing animal skins to leather: A benign alternative to chromium salts

Ms. Cecilia Rolence China is pursuing a PhD in Materials Science and Engineering. Prior to joining the program at Nelson Mandela African Institution of Science & Technology, under sponsorship of the African Development Bank and Water Infrastructure & Sustainable Energy Centre for the Futures (WISE FUTURES), Cecilia was a research officer at the Tanzania Industrial Research and Development Organisation in the department of Leather and Textile Technology.

Her work involved frequent industrial field visits. "I learnt that the leather industry was using a lot of chromium salts especially the small industries, yet they don't have efficient effluent treatment systems and so they were polluting water bodies."

The other concern for her was water. Leather processing requires a lot of water. She estimates that one kilogram of animal skin consumes about 35 litres of water. "So if you are using chromium you will generate a lot of effluent full of chromium and if not treated well it will go to the water bodies and affect marine life and people who use it, and it's also bad for plants."

Furthermore, chromium tanned leather when discarded is similar to plastic waste because it is non-biodegradable while leather tanned with organic agents is biodegradable. Wastewater from an organic tanning process is a rich fertilizer and the solid waste form composites for manure.

As a researcher she resolved that her research interests would focus on supporting small industries to produce in an eco-friendly manner. Relying on literature she found that she could develop organic extracts for leather processing using locally available plants in Tanzania. This would minimise over reliance on the harmful chromium salts.

"Other countries have used trees to prepare the organic compound that is able to interact with animal skin and make leather. I looked for plants in Tanzania with similar properties and I identified about 10 plants. I went into the literature to see the content to find the compound of my interest and I found four had the relevant content. I went on to test to see if they would work the way I thought theoretically. Then I wrote a proposal for my PhD."

Cecilia applied for a research training fellowship in India and she got it. This would give her an opportunity to access better labs to test the viability of those plants and to improve the property of the leather. Leather made of organic compounds has some weakness but which can be improved with appropriate chemicals. Again, she wanted to identify locally available materials that could improve leather. Soon enough she found that there was a special soil in Tanzania that contained leather strengthening ingredients.

"In India I used an existing organic chemical available commercially

Cecilia China at an IUCEA exhibition in Munyonyo, Uganda

to check if it could work when used in combination with the Tanzanian soil. It worked. The next step was to test if the combination of the soil and Tanzanian plant extracts could also tan leather. That became the gist of her PhD research - identifying plants in Tanzania with the right properties and to test the combination with soil.

Along the way she faced hurdles. There was no lab in Tanzania in which she could carry out experiments or analysis. Then, German Academic Exchange Service (DAAD) advertised a grant for a short research fellowship in Germany. She applied and identified an institution to host her and she got in. She travelled to Germany with her plants. The environment was conducive with supportive supervisors. She learnt how to use the equipment. She prepared the compounds from her plants and tested them at molecular level up to the skin. "Among the four plants I had travelled with, three worked and the fourth didn't because instead of stabilising it would give a colour and would make the leather too stiff."

She adds, "I got my results for publication. When I returned to Tanzania I decided to scale up and test on animal skin while using locally available resources. I used local equipment to imitate machines. It was tedious but I managed to come up with leather."

Cecilia is now working with SMEs in the leather industry and they have made some products. "My aim is to help SMEs to improve their technology in leather processing. I believe we cannot make the industry grow and sustainable without empowering the SMEs."

Dr. Didatienne Mukanyiligira, the Principal Investigator of the Project

IoT researchers to design a system to alert farmers on when to irrigate

A team of researchers from the African Centre of Excellence in Internet of Things (ACEIoT) and the School of ICT won a UR-Sida female project grant to develop a Wireless Sensor Network (WSN) system that will support irrigation management using data mining.

The researchers came up with the idea after realizing that there is a lack of accurate information on weather forecast that would consequently inform prudent irrigation schedules.

Dr. Didacienne Mukanyiligira, the Principal Investigator of this project explained that it will be a smart irrigation system that can monitor water quantity needed by the plant & soil and alert when the plant needs water.

"The system will consist of sensors installed in the field which collect information, such as amount of water in the field, and this will be sent to the server through LoRa gateway where it will be analyzed using data mining techniques," she said.

"The analyzed data will be sent to the farmers' mobile phone for timely irrigation. This system will save the farmer's time, improve the efficiency of water utilization and improve the Rwanda Economy as well," she added.

The wireless sensor network will collect information about soil moisture and wind speed and temperature. The project which started in August 2020 will be piloted in Bugesera District, Eastern Province of Rwanda.

The convergence and integration of IT with agricultural technology is considered a factor which can add value and productivity to agriculture.

https://aceiot.ur.ac.rw/ ACEIoT

CDT-Africa supports national COVID-19 response

The first cohort of Msc in Clinical Trials graduated in July 2020

After the first case of COVID-19 was reported in Ethiopia, the Centre for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa) formed a Knowledge Synthesis Team under the Knowledge Management Unit comprised of seven academics with different backgrounds in the field of health sciences. The knowledge synthesis team works on curating evidence daily from various credible sources. These updates are provided to the Ministry of Health of Ethiopia and are also shared on the center's website and social media platforms. This helps the Ministry to make informed decisions. The team has published several articles as an output from this, with two additional articles under review for publication and two more under preparation.

In addition, the center produced natural product-based hand sanitizer, which meets WHO Quality standards and with ability to kill 99.99% of bacteria. In April, the Lancet announced a global coalition to accelerate COVID-19 clinical research to control COVID-19. CDT-Africa is part of the coalition and through this they anticipate opportunities for clinical trials and other collaborations. The center has produced leaflets and distributed them at research sites to have well-informed staff. CDT also produced a short video about the use of face coverings and gave it to the Ministry of Health as a public educational resource.

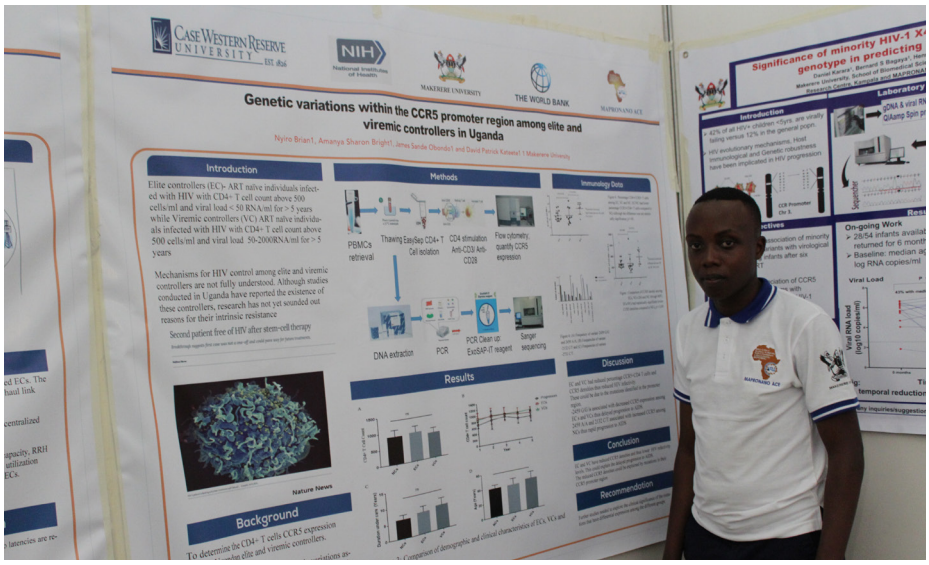
Teaching and learning online

As per the guidance of the Addis Ababa University and Ministry of Science and Higher Education, the Centre stopped face to face classes in March. Subsequently, the center started virtual education for both MSc and PhD students through Zoom and Google Meet platforms. The center evaluated the virtual training through an online anonymized feedback questionnaire at the beginning and mid-term of the virtual training which indicated successful rate of effectiveness. Sixteen students graduated on July 11, 2020, the first cohort of the CDT-Africa MSc in Clinical Trials programme.

http://www.cdt-africa.org/ cdtafrica

Immediate treatment may not be suitable for all HIV infected individuals

Research Topic: Genetic variations within ccr5 promoter region among Elite and Viremic controllers in Uganda



Brian Nyiro

Since September 2015 the World Health Organisation (WHO) recommended a 'test and treat' policy where all people with HIV infection, regardless of their CD4 count, are started on antiretroviral therapy (ART). This recommendation was based on evidence that immediate enrolment to treatment led to reduced HIV transmission and mortality. Mr. Brian Nyiro, a student pursuing a Master of Science in Immunology and Clinical Microbiology at Makerere University Kampala, says there are patients who are started on HIV treatment when they actually don't need it because they still have the ability to control the virus. "There is a shortage of ARVs yet everybody who tests positive is started on ART even the people who don't need it." Nyiro says that ART helps the people without inward ability, so-called non-controllers because when they get HIV they progress rapidly to AIDS within a period of 2-3 years and therefore need the ART more compared to the controllers with the ability to control the virus.

"My question was," said Brian, "could we have something that could differentiate between these two groups - the non-controllers and the controllers. Give ART only to the people who need it the most and also protect the controllers from the side effects that come with taking ARVs."

The controllers, he says, can control the virus for a period of 5-10 years. "So if you can halt treatment for at least a period of 7 years that can help to save them from the side effects of the drugs."

Test and treat should look at the individual and not cast a blanket solution for all. However, the strategy for early treatment also aimed to reduce the rate of transmission of the virus to other people, which could be reversed if the controllers remain untreated.

Nyiro said his research aims to find what makes the controllers unique. There are genes that encode for certain proteins that are required for HIV to infect these cells. "I found out variations of these genes that are within this one group that are not in the other group. These variations were in the controllers. So we can target these variations and design tools that can help differentiate between these two groups," he said.

Nyiro plans to publish a paper and present his findings at conferences.

"If I can develop a test that clearly shows the difference between the individuals that progress rapidly to AIDS and therefore need ART the most, and those that do not, I will head to the Ministry (of Health) and inform them of my findings. This could help to influence the policy to focus on the people who need it the most."

Nyiro is already making plans for his PhD studies. "Since I will already have the variations, I may try them in mice models and see the exact impact and then develop tests for trial on humans. I think this will be my PhD work."

Nyiro is a student at the Africa Centre of Excellence for Materials, Product Development & Nanotechnology (MAPRONANO)

MAPRONANO ACE's innovative technologies to fight COVID-19

Saliva diagnostic kit for detection of Covid-19 in saliva

Saliva is a comfortable and quick mass sampling option [Wang et al, 2004] with demonstrated high accuracy for COVID -19 diagnosis. MAPRONANO ACE is developing a COVID-19 diagnostic rapid test kit for detection of the virus in saliva in partnership with Makerere University College of Health Sciences and Uganda Virus Research Institute. The test kit will be cheap, safe, and non-invasive, with rapid turnaround time for detection of active Covid-19. It will be user-friendly allowing for individual self-collection of the sample. The intervention will minimise transmission risk faced by health care practitioners and facilitate effective diagnosis, efficient contact tracing and community surveillance.

Low cost alcohol based hand sanitizers

MAPRONANO ACE in partnership with Makerere University College of Health Sciences (MakCHS) have developed low cost hand sanitizer for use in resource-limited settings and in institutions and communities for effective hygiene and infection control. This is an alcohol hand sanitizer with 99.9% alcohol and is made from locally available materials and effective to kill the pathogens such as fungi, bacteria and viruses.

The Africa Center of Excellence in Materials Product Development and Nanotechnology (MAPRONANO ACE), based at Makerere University, has partnered with different stakeholders to develop products to tackle the Coronavirus.

The manufacture and preparation processes are done in the college of health sciences in partnership with Ryatumwa Ltd, a marketing company. The instant hand sanitizers are packaged in the following quantities (100mls, 60mls, 500mls, 1000mls/1Liters, 5 Liters and 20 Liters).

Portable mask sterilizing pod

The mask sterilization technique utilizes a pod with heat sources powered by electricity from the onboard batteries. The rechargeable Lithium ion batteries provide the DC current needed by the heating element to raise the pod temperatures up to 100 degrees Celsius enough to kill the Coronavirus.

Solar powered sanitizer booth

MAPRONANO ACE in partnership with CODEK ENGINEERING CO LTD, a private company, have jointly developed a walk-through solar powered sanitization booth to enable instant sanitization as people walk through it. The booth is designed with entrance proximity sensors which detect a person and release fog or atomized disinfectant. The heating element has a built-in thermostat to control its temperature and prevent self-destruction under extreme heat. The booth is also built with a temperature sensor that records a person's temperature.

Re-usable self-sanitizing mask

The product was developed for medical workers in high risk environments. The mask is designed with instant self-sanitization capability and allows the user to sanitize in real time. The mask is designed with a transparent glass face to prevent sneezed or coughed sputter from directly landing onto a medical workers' face and a built-in nose and mouth protection device to prevent breathing contaminated air. The mask has a built-in sanitizer container and spray to enable the user sanitize their garments, hands and body frequently. The re-usable mask can be used indefinitely and is ideal for resource stressed settings.

https://mapronano.mak.ac.ug/

Grid Innovation & Incubation Hub welcomes incubatees

Young entrepreneurs with innovative business ideas are set to benefit from the business incubator of the African Centre of Excellence in Energy for Sustainable Development (ACEESD) named the Grid Innovation and Incubation Hub (GIIH) at University of Rwanda. This is in a bid to inspire and mentor innovation-based entrepreneurship and create a space where start-ups can be supported.

ACEESD is one of the Africa Centers of Excellence that won a financial award of 250,000 USD, a grant from the World Bank, as a seed fund for the establishment of Incubation Centers for East and Southern Africa. Grid Innovation and Incubation Hub aims to discover, nurture, and fund exceptional youth business ideas that are innovative, scalable, with transformational potential.

Pascal Nyiringango, the Head of GIIH believes that exceptional ideas and exceptional founders should be matched with exceptional support. "Grid Innovation and Incubation Hub seeks to discover amazing, out-of-the-box, disruptive, highly innovative, scalable, and potentially transformational ideas from youth interested in different business but mostly focusing on renewable energy", he said.

The Hub offerings are designed in a way that increases the chances for the incubated startups to develop and grow beyond what they could achieve on their own. Incubatees will benefit from assistance with prototyping, patent drafting and IP, Mentoring, Coaching, and Access to seed funding among other services.

> Although all of them will not be selected to receive funding, we are very committed to supporting innovations.

So far 40 start-ups with innovative business ideas have expressed interest in being incubated among which 25 were selected to the final phase. In a one-week pitching exercise, 25 innovative idea owners were given an opportunity to explain how these innovations would benefit not only themselves but also the community at large.

During the official launch of the first virtual pitch event, Dr. Emile Bievenu, the UR Acting Deputy Vice Chancellor in charge of Academic Affairs and Research commended everyone who came up with innovative ideas.

"I was impressed by different ideas that were proposed. Although all of them will not be selected to receive funding, we are very committed to supporting innovations. This is in line with the global vison of UR. We want to produce young graduates equipped with entrepreneurship and employability skills", he said.

From the 25 contestants, 15 best ideas will be selected for incubation for a period of six months.

https://aceesd.ur.ac.rw/ @ace_esd

ACALISE acquires new hostel

Uganda Martyrs University (UMU) through the African Centre for Agroecology and Livelihood Systems (ACALISE) has acquired a semi-finished hostel facility. This will go a long way in addressing the accommodation challenge especially for the post graduate regional and female students at the Centre.

The double storied 32 bed hostel was funded by the World Bank after a careful assessment of the Centre's need for the facility and ascertaining the integrity of the building. The structure sits on one and half acres with room for more structures in future.

> "...the hostel is going to make a big difference to the Centre and UMU in general, as the University didn't have sufficient accommodation facilities for international students and staff on exchange programs.

According to the Vice Chancellor, Prof. John C. Maviiri, when fully completed and furnished, the hostel is going to make a big difference to the Centre and UMU in general, as the University didn't have sufficient accommodation facilities for international students and staff on exchange programs. The hostel will also be of benefit to short course attendees.

"ACALISE being a regional Centre, the hostel will provide substantial space for hosting regional students and other academics coming to UMU," said Dr Jude Ssebuwufu, Center Leader, ACALISE. "It will also be a source of income for the Centre long after the closure of the ACE II project."

https://acalise.umu.ac.ug/

PTRE promotes soap making trains biogas champions

The Africa Center for Excellence in Phytochemicals, Textile and Renewable Energy (ACEII - PTRE) mission is to provide skilled and empowered human capacity in Phytochemicals, Textile and Renewable energy with the potential to develop innovative products of high value and quality and offer solutions for the industrial sector. A short course on soap and detergent was conducted in Kesses in Eldoret, Kenya to empower the local community with income generating skills.

Trainees display their soap products during the training at A.I.C Tuiyobei, Kesses, Eldoret, Kenya

Biogas Champions

The youth constitute the majority of the Kenyan population and empowering them to participate in activities about resource efficiency and renewable energy uptake is key to the achievement of sustainable development. Thus, ACE II PTRE has trained students from four high schools of Kapsabet High School, Moi Girls High School, Kaptagat Girls High School, and Paul Boit Boys High School in Kenya with an aim to inspire future biogas champions who will promote biogas adoption in their communities. The week-long training sessions under the theme *inspiring future renewable energy leaders* sensitized the students on the relevance of biogas technology.

ICPTRE2020 Virtual International Conference

ACEII - PTRE Center and Sino-Africa Symposium on Textiles and Apparel (SAISTA), and Donghua University, hosted a Virtual International Conference on Phytochemistry, Textile and Renewable Energy Technologies for Sustainable Development from 12th -14th August, 2020 in Eldoret. The Theme of the Conference was, "***Advancing Science, Technology and Innovation for Industrial Growth***." The conference aimed at providing a platform for academic researchers across the world to meet key industry professionals and actively share knowledge on advancing the role of research in industrial development, particularly, in the developing nations.

excellencecenter.mu.ac.ke ace2ptre

AquaFish develops postgraduate tracking system

African Centre of Excellence in Aquaculture and Fisheries (AquaFish) in collaboration with the Lilongwe University of Agriculture and Natural Resources (LUANAR) ICT department have developed a postgraduate tracking system.

> "Students and their supervisors will have an opportunity to schedule meetings, share notes as well check the research progress through a dashboard which shall alert the student and the supervisor on the progress.

"The system is online-based and will help create a platform for interaction between the student and the supervisor. Students and their supervisors will have an opportunity to schedule meetings, share notes as well check the research progress through a dashboard which shall alert the student and the supervisor on the progress," said Prof. Daud Kassam, AquaFish Deputy Director.

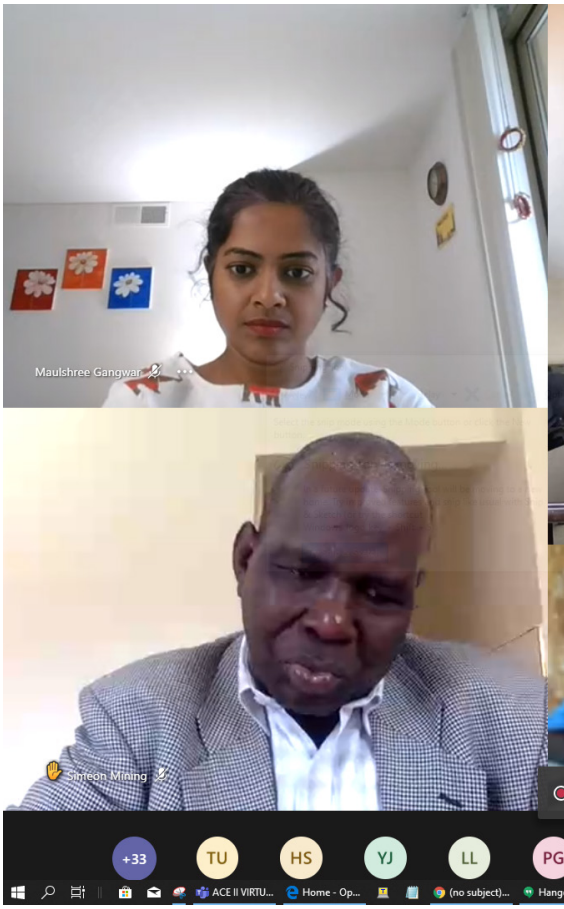
The system will allow the Dean of Postgraduate Students, the Academic Registrar and heads of departments to follow up on student progress. The Dean of Postgraduate Studies, Dr. MacDonald Mwinjilo commended AquaFish for coming up with the initiative saying it will improve the research environment at LUANAR.

"Firstly, let me thank AquaFish for their effort to help reduce the challenges we have with students' research completion. Over the years, we have had issues. It has been a blame game between students and staff. At the moment, many candidates have exceeded their time so this system will help us address challenges of not meeting deadlines," said Dr. Mwinjilo.

The Centre is piloting the tracking system with staff and students from AquaFish and will roll it out to the rest of the university soon.

http://www.luanar.a AquaFish_Luanar

From classroom to online teaching: Takeaways from ACE virtual meeting



A Technical and Advisory meeting for the Eastern and Southern Africa Centers of Excellence (ACE II) Project was held virtually from June 16 – 18, 2020. The ACE II holds two annual meetings for knowledge-sharing and network building among the Africa Centers of Excellence (ACEs).

Center Leaders talked about the measures their host institutions had taken to manage the disruption of the education calendar by the pandemic. All ACE II hosting universities suspended on-campus, face to face teaching in March 2020. Research and learning were severely disrupted and students couldn't access laboratories and practical lessons. Travel restrictions affected planned exchanges and conferences. Most students returned home and some institutions started to move classes online.

In light of COVID-19 and the closure of many universities, the World Bank called on the Centers of Excellence to focus on emergency response in the short-term to keep students learning. To support these efforts the World Bank in partnership with the Association of African Universities (AAU) formed four taskforces to focus on;

- **Capacity building**
- **Connectivity**
- **Platforms, Learning Management Systems (LMS) and content**
- **Communication**

The taskforce for capacity building organised four webinars for university instructors on the use and integration of online educational resources into their courses.

The taskforce on Platforms, Learning Management Systems (LMS) and online content identified the various online content support partners, MOOCs and Open Educational Resources that could support online learning for free or at a cost, such as Coursera, edX, FUN(France Université Numérique) and IBM.

ACEs were tasked to develop an action plan for the immediate/short term interventions with timelines of (0 – 6 months) and implement it. Then develop another action plan for medium/long term interventions of 7months – 5years. Short term actions would include assessment of the already existing digital capacity at the Centers and host institutions. Medium to long actions would include a launch for digital studio procurement, developing an ACE network for Digital Education and a one-year digital learning training for faculty.

A catalogue of courses was shared with centers via online links. The task force contacted some of the well-known LMS providers to provide capacity building virtual workshops to ACE hosting universities.

> "Short term actions would include assessment of the already existing digital capacity at the Centers and host institutions. Medium to long actions would include a launch for digital studio procurement, developing an ACE network for Digital Education and a one-year digital learning training for faculty.

However, it was noted that there were technology challenges to anticipate. Students and faculty lack enough connectivity and devices at home, especially for students living in remote areas. Students' capacity to adapt was a challenge since many, if not most, students are not experienced as online learners. Also of concern was the ability for faculty to deliver remote courses since many had never delivered remotely.

Nevertheless, as it was noted at the meeting, COVID-19 provides an opportunity to pause and reflect and search for opportunities to transform higher education for the benefit of all.

ACEs in national response to COVID-19

CDT-Africa - is actively participated in the national response to COVID-19 prevention, diagnosis and treatment development. The Center developed a sanitiser and PPE, and they synthesize knowledge on COVID-19. CDT-A is part of a global coalition to control COVID-19 and through this anticipate opportunities for clinical trials and other collaborations.

WISE FUTURES - To produce PPE and ventilator equipment in collaboration with Worcester Polytechnic Institute.

CS-OGET – is designing a project to study and produce Eucalyptus Oil extract which is well known as a good product to help fighting against respiratory diseases.

ACEIDHA - The Center is working together with the Zambia National Public Health Institute to set up field communication systems for easy tracking and documentation of COVID cases. The Center injected 200, 000 that it received from the Skoll Foundation

SACIDS - received funding from the Skoll Foundation to support diagnostics and testing, surveillance, tools and strategy development, and risk assessment/communication/mitigation. The SACIDS team is providing technical expertise to the national response, and has developed a training module for community COVID-19 surveillance for Africa CDC.

MAPRONANO ACE - in partnership with Makerere University College of Health Sciences (MakCHS) have developed low cost hand sanitizer for use in resource-limited settings and use in institutions and communities for effective hygiene and infection control. They have developing a range of products for diagnosis, sterilisation, sanitising booths and others.

ACEITLMS builds academic staff capacity to teach virtually

From 27th to 29th August 2020, the African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS) held a three-day training workshop on innovative pedagogical approaches using instructional **technologies for teaching staff.**

This followed directives from the University of Rwanda to ensure that classes go ahead regardless of the Covid-19 pandemic by switching from face-to-face to online teaching method. To teach online, Centre staff had to upload the required teaching and learning materials on UR e-learning platform. Microsoft team viewer is one of the software being used to deliver online classes but it was noted that academic staff were not familiar with it.

The main objective of the training was to equip Centre staff with skills to conduct and manage virtual classes for improved teaching and learning as part of the implementation of innovative pedagogical approaches. 19 teaching staff were trained during this workshop.

> "equip Centre staff with skills to conduct and manage virtual classes for improved teaching and learning as part of the implementation of innovative pedagogical approaches.

Now, learning materials in form of power point presentations, subject content summary notes, individual and group assignment are accessible online and students can access them. For most modules, forum discussions have been created where students can interact amongst themselves and with their lecturers.

"As one of the Centre's mandate is to bring innovation in teaching and learning of mathematics and science including the use of ICT, the ACEITLMS has decided and calls upon teaching staff involved in teaching Masters of Education modules to start conducting active online teaching with more student-lecturer interaction," said Prof. Lakhan Lal Yadav, Centre Director.

A look at ACE MSc. Student Research Projects

The 24 higher education Africa Centers of Excellence (ACEs) currently host about 1,142 Masters Students. Each of these students is working independently on a research project in a field of their interest to fulfil the requirements for a Masters award. Here, we highlight some of the research projects by the pioneer recipients of the ACE Scholarship program.

Angel Gabriel Meela

MSc in Internet of Things specializing in Wireless Sensor Networks, University of Rwanda

Research Topic: Design and simulation of an improved energy efficient algorithm for IoT based environment. A case study of a smart home

Smart homes has emerged with the use of a variety of sensors whose key purpose is to use technology to provide residents with comfort, convenience, security and efficiency in the management of home utilities such as electricity and water.

With Internet of Things technology (Wireless Sensor Networks) I am designing an automated smart home testbed where there will be prediction of next events/occupation and prediction of device occupation. Also there will be automated switching off of appliances which are unnecessarily consuming power. This is made possible with the use of sensors and actuators where the movement of inhabitants and device occupation will be recorded for prediction of next events. The prediction is done with the help of data algorithms. As a result, there will be energy-efficiency and the cost of electricity will be minimised.

Asya Suleiman Mgeni

MSc. in Internet of Things, the University of Rwanda

Research Topic: Development of IoT solution for small sailing boat monitoring

and tracking using LORA technology

This research aims to address the various challenges facing marine small sailing boat transportation in Zanzibar by establishing an IoT based solution for tracking and monitoring sailing boats at Zanzibar seashore.

Zanzibar people use the ocean for transportation, fishing and tourism. The most common mode of transport are the small boats. However, according to officials at Zanzibar Port Authority officials, the boats don't have proper and efficient communication capabilities. The lack of real-time monitoring and alert systems increases undesirable consequences.

This system will enhance the Zanzibar maritime communication between boat and port authority. Specifically, it will help to minimize the collision between boats, sinking of the boats, and boat disappearance. The research will help improve safety of small boat transport.

Benat Eusman Adbulkadir

Course: Msc in Molecular Biology and Biotechnology at SACIDS, Sokoine University of Agriculture

Research Topic: Analysis of Morphological and Molecular Genetic Diversity in stinging nettle (urtica simensis) from Northern Ethiopia

Morphological and Molecular based genetic diversity is the part which plays a great role in maintaining biodiversity specifically with conserving endemic species like urtica simensis which is an erect perennial herb that is endemic to Ethiopia. It is consumed as a vegetable in some parts of Ethiopia. It also has medicinal properties.

This study gives the overall morphological characterization, genetic variability and patterns of distribution. This will be of great importance for the detection of its valuable genetic resources and an important basis for its conservation and in planning a sustainable conservation policy.

This plant has the potential to combat food insecurity and to solve the alarming rate of antibiotic resistance through production of cheaper, effective, plant based drugs with better bioactive potential and with minimal side effects.

Naomi Kaonga

Course: MSc in One Health Molecular Biology at SACIDS, Sokoine University of Agriculture

Topic: Characterization of CTX-M-Type Extended Spectrum Beta-Lactamase Producing Salmonella Typhimurium in Poultry Farms in the Copperbelt Province, Zambia.

I am working on Antimicrobial Resistance (AMR). The impact of AMR has become a threat worldwide and solving this challenge is not a one man affair. There is need to educate society on AMR. Since their discovery in the early 1900s, β-lactam antibiotics have been used to treat different infections. However, bacterial resistance to these antibiotics has emerged gradually and has progressed rapidly due to the transfer of beta lactamase-encoding genes called Extended Spectrum Beta- Lactamases (ESBLs). This emergence of antimicrobial resistant bacterial strains has been associated with abuse of antibiotics in Humans as well as Animals.

Through questionnaire interviews and farm visits, I discovered that farmers know little to nothing on AMR and yet use antibiotics frequently. Through interactive discussions, I was able to educate farmers on the dangers of antibiotic abuse to animals and to humans who can acquire resistant genes through consumption of contaminated animal products.

In my laboratory investigations, I have been able to detect resistant genes through Polymerase Chain Reaction (PCR) and Multi Drug Resistance (MDR) through Disc Susceptibility Testing. This research will contribute to the generation of knowledge in the Copperbelt province and beyond.

Elizabeth Kiflay

Masters in Material Science and Engineering (Structural Materials), WISE-Futures ACE, Nelson Mandela Africa Institute of Science and Technology, Tanzania

Discharging untreated wastewater causes severe aquatic pollution due to high biochemical oxygen demand, nutrients, and other toxic chemicals in the wastewater. I am currently working on wastewater

treatment technologies that can make wastewater suitable for reuse or discharge in the environment. I am studying three wastewater treatment systems - constructed wetland, anaerobic baffled reactor, and floating constructed wetland – specifically, their efficiency and performance on the removal of pollutants from industrial wastewater. My study findings will help in minimising aquatic pollution due to untreated industrial wastewater.

Bienvenue Carelle Ingabire

Msc in Agricultural Economics, Center of Excellence in Sustainable Agriculture and Agribusiness Management (CEESAM), Egerton University, Kenya

Research topic: Role of irrigated agriculture on household resilience to drought in Northern Burundi

Burundi has been experiencing droughts especially in the Northern region. The drought that occurs almost annually in Kirundo province, in the north of the country, makes agriculture, the main livelihood activity, more vulnerable and has led to famine and severe food insecurity. Again, despite the fact that Kirundo has huge potential for irrigation through exploitation of its abundant water resources, the province is one of the most vulnerable in Burundi.

Therefore, the results from this study will contribute to building evidence for one of the resilience strategies (irrigation) that makes smallholder farmers able to cope and recover from drought. Furthermore, the study will contribute to irrigated agriculture and resilience to drought literature for further research and interventions in this area.

Nassazi Winfred

African Centre of Excellence in Phytochemicals, Textile and Renewable Energy (ACE II-PTRE), Moi University

Research Topic: Isolation and characterization of phenolic compounds from leaves extracts of ocimum gratissimum and rosmarinus officinalis and their antioxidant and anti-proliferative activity

Cancer remains a huge medical challenge globally. In her Msc. research project, Ms. Winfred Nassazi, is trying to determine the antioxidant and anti-proliferative properties of phenolic compounds of crude leaf extracts of Ocimum gratissimum and Rosmarinus officinalis. She hopes that the findings can provide data on efficacy of polyphenols in O. gratissimum and R. officinalis leaf extracts against human prostate, cervical and colorectal cancer cells. Nassazi also hopes her study can enhance community use of these herbs and provide information as to which of the two, O. gratissimum and R. officinalis in the Lamiaceae family, is highly effective against human prostate, cervical and colorectal cancer cells.

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The ACE II Community congratulates Inter-University Council for East Africa (IUCEA), Regional Facilitation Unit for ACE II.

Thank you for being an essential part of our success. Congratulations on your 50th anniversary and best wishes for the next 50 years.