NEWSLETTER

African Centres of Excellence

ACE-ESD | ACE ITLMS | ACE-DS | ACEIoT

Master students from Energy Centre visit Ntaruka Hydropower Plant to gain practical skills

ACEDS conducted the fifth PhD Symposium to assess students' progress

he African Centre of Excellence in Data Science (ACE-DS) has conductedthe fifth PhD Symposium to thoroughly follow up on the progress of PhD students as they progressively approach their graduation. This symposium was held virtually due to Covid-19 pandemic restrictions.

ACEIoT shares best practices for teaching the Internet of Things

The African Centre of Excellence for Internet of Things has shared with different higher learning institutions best practices in teaching the internet of Things in order to discuss together how to improve IoT teaching. These best practices were shared during a workshop, which put together representatives of institutions dealing with education of internet of things.

Staff and students from ACEITLMS get tips on proposal writing and research methods

48 staff, MEd and PhD students from the African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS), African Centre of Excellence in Data Science (ACEDS) and the region have participated in a five- day virtual training on proposal writing and research methods in order to equip

ACEIoT shares best practices for teaching the Internet of Things

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The IoT is expanding, as the continual decrease in size, cost and energy consumption of wireless devices boost the number of deployed devices dramatically. With the advancement of the IoT, there is a worldwide need for technical professionals involved in developing IoT networks.

While sharing the experience, the Acting Centre Director Dr. Damien Hanyurwimfura said that one of the ways that was found relevant and giving good results in teaching IoT is to introduce the Self-directed learning activities where by case studies and mini research projects are given to students for their own studies and documentation.

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He also revealed that effort should be put on giving students the opportunity of having hands on works. "Through simulators (CISCO Packet tracer, Proteus, etc) students are directed on how to program IoT equipment and are given projects to work on", he added.

Among other methods that are used to better teach IoT is to connect the students with companies and industry and participate in their project implementation for a given period in order to get used and experienced.

Amid the ongoing Covid-19 pandemic, teaching and learning internet of things is being handled by providing a course handbook to students in advance and having lecture materials uploaded to the website for easy access.

The workshop which was organized by The Abdus Salam International Centre for Theoretical Physics had the main objective of sharing experiences gained in organizing training activities in IoT for a diverse range of participants (students, researchers, managers, practitioners, regulators, etc).

Other Universities which shared their experiences include the UNIVERSITAT POLITÈCNICA DE VALÈNCIA, Spain, Linnaeus University, Sweden, and Kobe Institute of Computing, Japan.

www.aceiot.ur.ac.rw

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The African Centre of Excellence in Data Science (ACE-DS) has conducted the fifth PhD Symposium to thoroughly follow up on the progress of PhD students as they progressively approach their graduation. This symposium was held virtually due to Covid-19 pandemic restrictions.

The Symposium serves as the opportunity for both supervisors and Centre Management to guide and provide inputs to the research projects for PhD candidates with the support of multidisciplinary panelists from the University of Rwanda, regional and International Universities.

It is also an opportunity for students to understand general rules and procedures of supervision evaluate the expected productive relationship between the supervisor and the supervisee, assess the quality and progress of each PhD research project "As the time goes by, students are approaching their post graduate graduation.

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will bringsolutions to regional problems",Dr. Charles Ruranga, the Centre Director said.

He added that the symposium serves also as an opportunity to identify challenges that both

students and supervisors are facing to address them ahead of time before they affect students' progress.

Trainings at PhD level at ACEDS are provided through carefully designed curricula to promote cutting-edge interdisciplinary and multidisciplinary research in Data Mining, Biostatistics, Demography, Econometrics and Actuarial Sciences.

The Symposium was attended by 40 PhD students and 44 supervisors.

www.aceds.ur.ac.rw

ACEIoT Researchers' paper get recognized as the 'Best' in the international conference

CERTIFICATE OF BEST PAPER

THIS IS HEREBY PRESENTED TO

EVARISTE TWAHIRWA
(UNIVERSITY OF RWANDA, RWANDA)

FOR THE PAPER TITLED

A LORA ENABLED IOT-BASED AIR QUALITY MONITORING SYSTEM FOR SMART CITY

IN THE CATEGORY OF

IOT ENABLING TECHNOLOGIES

AT IEEE AIIOT 2021
ON 10TH - 13TH MAY 2021

WORLD AI IOT CONGRESS

IEEE AIIOT 2021

VIRTUAL CONFERENCE

IEEE WORLD AI IOT CONGRESS 2021

Certificate of recognition

A team of researchers from African Centre of Excellence in Internet of Things (ACEIoT) have presented a research paper which was recognized as the best during the virtual 2021 IEEE World AI IoT Congress in the category of IoT enabling Technologies. The paper is entitled 'A Lora enabled IoT-based air quality monitoring system for smart city".

The authors whose paper was chosen to be the best include Evariste Twahirwa, Kambombo Mtonga, PhD candidates at ACEIoT, Desire Ngabo, Research assistant and Assistant Lecturer in the School of ICT and Prof Santhi Kumaran.

"Congratulations! We are very happy to announce that your

research paper has been chosen as the best paper as per the reviewers", said Rajashree Paul, Technical Co-Chair, 2021 IEEE World AI IoT Congress.

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The research paper described a work, in which a domesticated air

pollution monitoring system over the LoRa enabled Internet of Things framework is proposed.

Two sensors for CO_2 and PM that are important for air quality monitoring with compensated weather monitoring capabilities were deployed in the cafeteria kitchen and laboratory room of the University of Rwanda, College of Science and Technology.

The sensed parameter readings are then sent to the cloud via LoRaWAN protocol supported gateway that interfaces the sensors and the cloud part of the network.

Congratulations to the team!

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Master students from Energy Centre visit Ntaruka Hydropower Plant to gain practical skills

Master students from ACEESD at Ntaruka

40 Master students from African Centre of Excellence in Energy for Sustainable Development (ACEESD) specializing in Energy Economics, Renewable Energy and Electrical Power Systems visited Ntaruka Hydropower plant to have their theoretical skills linked with technical experience.

During this visit, students were taken through the whole process of power generation from creation of water reservoir at Ruhondo Lake, processing and supply of generated electricity to different parts of the country.

Habiyaremye Theogene, a Master student in science in Electrical Power System, one of these students, finds this visit very fruitful. He says during the visit they identified the relationship between the modules they learn in class and the real business.
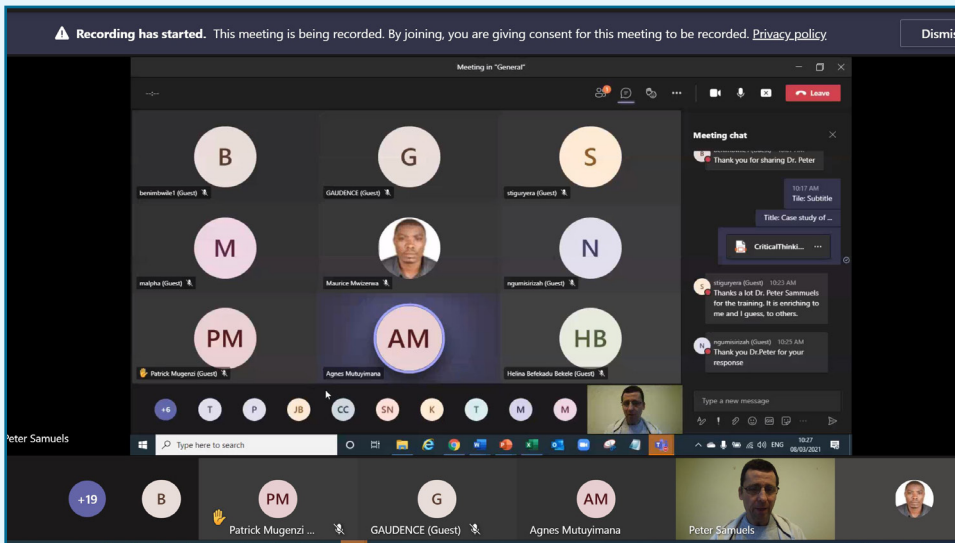
> **"When we are in class, we sometimes doubt if really what we are leaning in class theoretically can technically match with what is expected to be performed at the site"**

'When we are in class, we sometimes doubt if really what we are leaning in class theoretically can technically match with what is expectedto be performed at the site" said Habiyaremye adding that they learnt different modules related to signal processing and now they toured the control room at the site and technical expert explained really how they work.

Aphrodis Nduwamungu, a Research Laboratory Engineer at the Centre says that when students visit this kind of plants ; their minds are open to the real business as they get more explanations from the expert at the site who deals with technical work to be matched with the theoretical skills they have been receiving from lecturers.

A culture of taking students to various hydropower plants has got support at ACEESD after identifying that it is a good approach to ensure students complete their program fully equipped with both theoretical and technical skills to be much more competent while at the labor market.

Ntaruka Hydropower plant is located in Burera District of the Northern Province of Rwanda and is one of the ancient Hydropower plants, which was constructed during the colonial period and generates around 10.5 MW.

www.aceesd.ur.ac.rw

Staff and students from ACEITLMS get tips on proposal writing and research methods

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48 staff, MEd and PhD students from the African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS), African Centre of Excellence in Data Science (ACEDS) and the region have participated in a five- day virtual training, organized by the ACEITLMS; on proposal writing and research methods in order to equip them with sufficient updated skills to write a convincing and wining research proposal.

The core mission of the PhD and MEd programs at ACEITLMS is to conduct quality research, which address the societal needs and deliver indispensable trainings and short courses to support capacity building of mathematics and science educator in Rwanda and across the region.

Therefore, students need to know how to write proposals that can compete at international level.

During this training, trainees were tipped on writing and publishing scientific papers, managing research activities and time allocated to it, supervisory relationship and techniques to get the most out of it, what is needed to write competitive proposals to secure funds among other skills.

" I learned how to organize my research proposal in such a way it could be clear, logical and meaningful to what I intend to research on.

I learned how to create a good rapport with my supervisory team and the tips on how to manage stress in PhD journey"

This training was highly important

especially to PhD students who are supposed to conduct research that will generate solutions to existing community challenges and these researches should be funded. Therefore, these students needed enough skills to write convincing and fundable projects.

"The training was timely and beneficial. I learned how to organize my research proposal in such a way it could be clear, logical and meaningful to what I intend to research on.

I learned how to create a good rapport with my supervisory team and the tips on how to manage stress in PhD journey" testifies Ms. Marcelina Majenda, after completing the training.

Ben Mbwire, another PhD student who attended the training finds it highly insightful. "I have found the training sessions quite insightful and thought provoking. I like the fact that there was a hands-on or practical exercise at the end of each section.

That helped me to practice the skills I gained such as paragraph writing, doing literature reviews, critiquing papers - especially my proposal, structuring my proposal among other skills", he said.

During the training, participants covered a number of concepts mainly academic writing style, use of evidence and avoiding plagiarism, argumentation and argument planning among others.

www.aceitlms.ur.ac.rw

Meet Katundu Imasiku, a Phd Candidate at ACEESD who won a research grant

Katundu Imasiku, a Phd Candidate at ACEESD

Katundu Imasiku, a PhD Candidate specializing in Renewable Energy is poised to receive a grant he won to find out how renewable energy can be used to produce food. The grant worth R12-million (about 862 million RWF) over a period of 2 years, is awarded by UK Research and Innovation (UKRI) to a consortium of 16 African Research Universities Alliance (ARUA) universities.

The grant is hosted by the Centre of Excellence (CoE) in Energy at Stellenbosch University.

The consortium awardee Universities are from Ethiopia, Ghana, Kenya, Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda.

Each of these universities gave a pitch of the area of interest but falling under the umbrella of Food-Water-Energy nexus projects.

For Rwanda, Katundu's selected pitch is "Food-Energy-Water Project for Sustainable Agriculture in Rwanda".

This project involves using solar energy (renewable energy resource) to harvest the water resource and use it for growing agricultural crops.

"My motivation to pitch on behalf of the African Centre of Excellence in Energy for Sustainable development (ACEESD) and UR in 2018 was not just to try to make the ACEESD gain recognition but to also contribute to providing the sustainable agricultural solutions in Rwanda", Imasiku said.

Apart from creating opportunities for collaborative research projects to address actual problems in the Food, Water & Energy sector in Rwanda, the grant will offer scholarships for trainings/capacity building at Certificate, Masters, PhD and Postdoc levels to mostly UR staff and UR students, through the Stellenbosch University African Doctoral Academy.

It is expected that the fund will enhance agricultural system and crop yield in Rwanda, Explore sustainable agriculture solutions using solar energy, Increase food-water-energy nexus visibility through publications, and increase food-water-energy nexus visibility through publications among other expectations.

www.aceesd.ur.ac.rw

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The first three PhD candidates from ACEITLMS defend their theses

Mr Angel Mukuka: "Effects of cooperative learning on students' mathematical reasoning and self-efficacy in selected secondary schools, Ndola District, Zambia"

Congratulations!

Mr. Njiku Joseph: "Effects of professional development activities on mathematics teachers' technological pedagogical content knowledge and attitude in Tanzania: A case of Dar-Es-Salam Region".

Congratulations!

Mr Kizito Ndihokubwayo: "Assessment of instructional tools for active learning of optics at advanced level secondary schools in Rwanda."

Congratulations!

ACEs in numbers

517	Number of students enrolled in Msc programs	517
171	Number of students enrolled in PhD programs	171
1042	Number of private/public professionals who got professional courses	1042
167	Number of research papers published in international journals	167

Our respective programs

African Centre of Excellence in Data Science (ACEDS) based at UR-College of Business and Economics, Gikondo

We have Day and evening Programs:

- Master/PhD of Science in Data Science in Data Mining
- Master/PhD of Science in Data Science in Econometrics
- Master/PhD of Science in Data Science in Biostatistics
- Master/PhD of Science in Data Science in Demography
- Master/PhD of Science in Data Science in Actuarial Sciences

N.B: All PhD programs are by research.

In partnership with **Data Science Council of America (DASCA), we also offer certified professional Short courses:**

a. Associate Big Data Engineer (ABDE)
b. Senior Big Data Engineer (SBDE)
c. Associate Big Data Analyst (ABDA)
d. Senior Big Data Analyst (SBDA)
e. Senior Big Data Analyst (SBDA)

More details: www.aceds.ur.ac.rw

African Centre of Excellence for Innovative Teaching and Learning Mathematics and Sciences (ACEITLMS) based at UR-College of Education, Rukara

We have Day and Weekend Programs:

- Master of Education in Biology Education
- Master of Education in Chemistry Education
- Master of Education in Physics Education
- Master of Education in Mathematics Education
- PhD in Biology Education
- PhD in Chemistry Education
- PhD in Physics Education
- PhD in Mathematics Education

N.B: All PhD programs are by research.

More details: www.aceitlms.ur.ac.rw

African Centre of Excellence in Internet of Things (ACEIoT) based at UR-College of Science and Technology, Nyarugenge

We have the following Programs:

- Master/PhD of Science in Embedded Computing Systems (ECS)
- Master/PhD of Science in Wireless Sensor Computing (WSC)

N.B: All PhD programs are by research.

Short courses:

a. Rapid Prototyping
b. Blockchain Fundamentals and Applications
c. Drone fundamentals and applications
d. LoRA technologies
e. IEEE GRSS Drone Sensor Deployment

More Details: www.aceiot.ur.ac.rw

African Centre of Excellence in Energy for Sustainable Development (ACEESD) based at UR-College of Science and Technology, Nyarugenge

We have the following Programs:

- Master/PhD of Science in Energy Economics
- Master/PhD of Science in Renewable Energy
- Master/PhD of Science in Electrical Power Systems

N.B: All PhD programs are by research.

Short courses:
Power Engineering, Smartgrid, Microgrid

More Details: www.aceesd.ur.ac.rw

Eastern and Southern Africa Higher Education Centers of Excellence Project

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