



NEWSLETTER

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African Centres of Excellence



ANGEL MUKUKA
Specialized in Mathematics Education



JOSEPH NJIKU
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Kizito NDIHOKUBWAYO
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Meet the first three PhD candidates who defended their theses under UR-ACEs (ACEITLMS)

Page 6,7&8

ACEIoT shines at the 2021 global tinyML EMEA Technical forum

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Page 2

Master students from Energy Centre complete their internship; hail the Centre for this new practice

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Page 5


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Page 4

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Tomas Edsö,
Arm



Gian Marco Iodice,
Arm




Rosemary Nalwanga,
University of Rwanda




Samson Otieno Ooko,
University of Rwanda


Panelists




Marvin C
University of Rwanda



Jan Jongboom,
Edge Impulse



Ciira Maina,
Dedan Kimathi University
of Technology, Kenya



Rosemary, Marvin and Samson among the TinyML for Good panelist at TinyML 2021

From June 7th to 10th 2021, three master students from the African Centre of Excellence in Internet of Things (ACEIoT) namely Rosemary Nalwanga, Samson Otieno Ooko and Marvin Muyonga Ogore virtually attended the tinyML Europe, Middle East, and Africa (EMEA) 2021 Global Technical Forum in which they presented their preliminary Master Thesis research results on edge artificial intelligence (AI).

The forum's focus was on Machine Learning (ML) technologies and applications capable of performing on-device sensor data analytics (technically known as inference) at extremely low power, typically in the mW range and below, and hence enabling a variety of always-on real-time use-cases using battery operated or ambient energy harvesting devices.

The research of Marvin Muyonga

Ogore on 'Offline non-invasive detection of Cholera at communal water taps' has been shortlisted among the best presented abstracts; therefore getting a rare opportunity to present in the

“ It was noted that Africa features many open opportunities for TinyML applications in line with the sustainable development goals (SDG) however it is still experiencing logistic challenges in the procurement of embedded devices, components and development boards. ”

tiny talks category among the big industrial and research players in Edge AI technologies such as ARM.

Samson Otieno Ooko was selected to present his unique research on Edge AI inference for early detection of respiratory diseases from exhaled breath during the student forum among other PHD candidates from across Europe.

The edge AI research use cases in precision agriculture, medicine and smart environment respectively explored by Rosemary, Samson and Marvin, enabled them to get selected to take part in a panel discussion about tinyML for good, interacting with top managers from ARM and Edge Impulse.

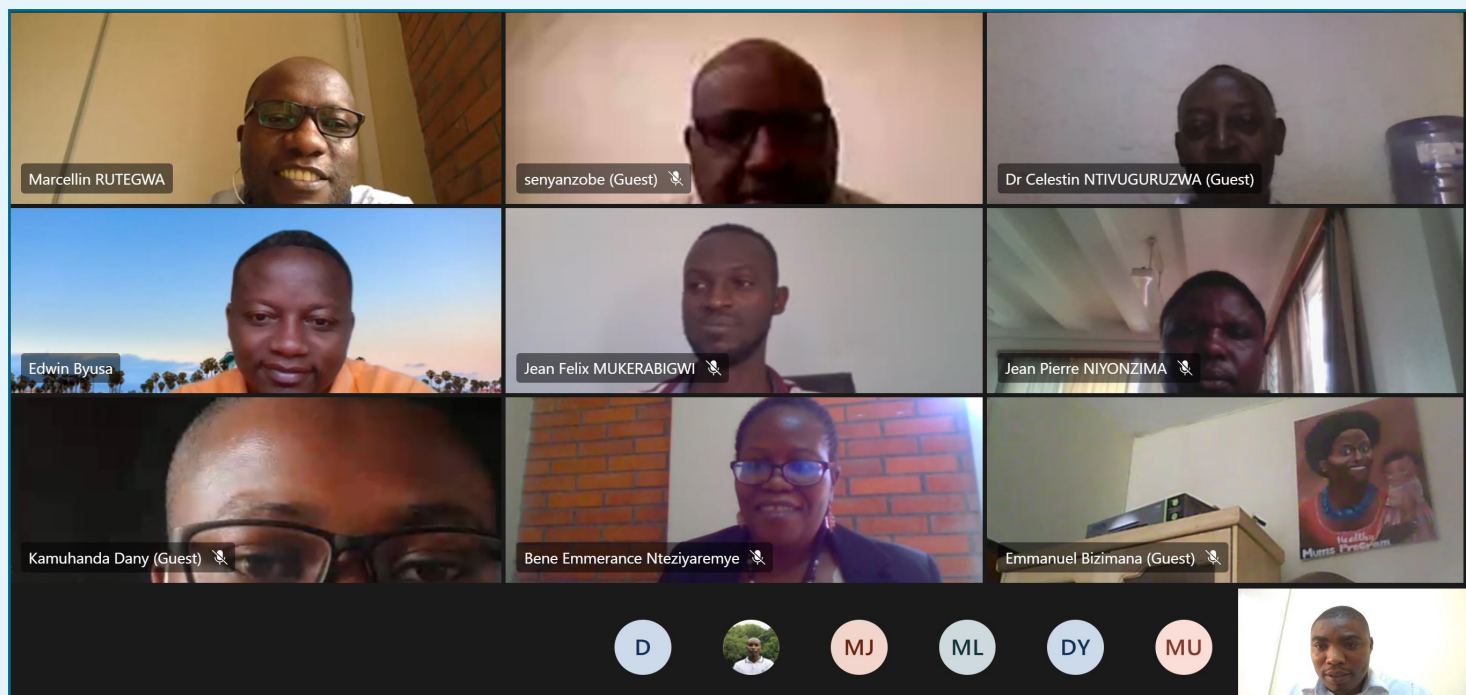
This panel highlighted the need for more involvement and collaboration as a stepping stone towards ensuring tinyML for good especially in the developing worlds.

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ACEIoT has temporarily relied on using embedded simulation and came up with a rapid open-source based edge AI prototyping toolstack, an approach that got a great appreciation from the forum's audience.

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26 researchers tipped on best practices in postgraduate supervision



The training was conducted virtually due to covid-19 restrictions

From 15th to 16th June 2021, 26 researchers from UR and other Higher Learning Institutions participated in a two-day training workshop in which they were tipped on best practices in postgraduate supervision.

The training was organized by ACEITLMS in the journey of building and strengthening human capacity in conducting and supporting research aiming at addressing societal needs.

Participants were from UR-College of Education (UR-CE), UR-College of Agriculture and veterinary medicine (UR-CAVM) and Catholic University of Rwanda.

Part of the training was dedicated to sharing experience on educational research processes

with particular focus on postgraduate research processes and student support for quality Postgraduate outputs.

“Participants were trained on practical issues pertaining to educational research and postgraduate supervision namely the structure and regulations frameworks of UR for postgraduate supervision, common challenges in postgraduate supervision and how to deal with these challenges.”

This was done through interactive

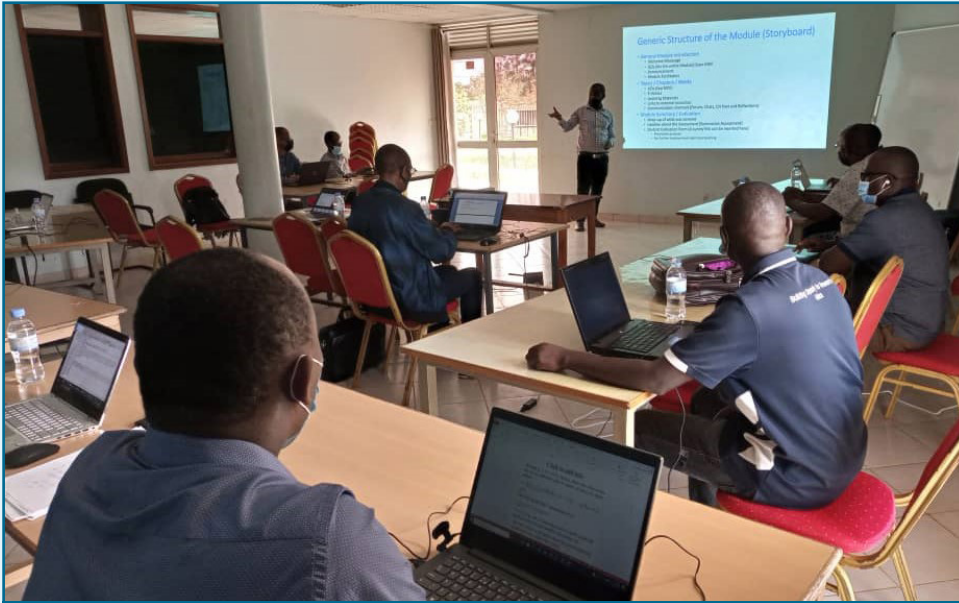
lectures and practical activities mainly delivered by experienced academic staff from UR-College of Education.

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The training was conducted online and training materials were uploaded. In addition to live presentations, online activities were organized to make the training interactive.

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ACEDS faculty staff trained on Online Module Design, Teaching and Uploading Materials on E-learning Platform



Participants to the training observed social distancing to curb the spread of Covid-19

Following the spread of Covid-19 pandemic, the face-to-face teaching method was interrupted. The online mode of teaching was introduced to curb the spread of the pandemic.

The University of Rwanda as many other Universities in the world shifted abruptly to this online mode of teaching and faculties were not fully acquainted with necessary skills to adapt themselves to the new way of teaching.

The African Centre of Excellence in Data Science had to comply with the new mode of teaching to avoid and prevent the spread of the COVID 19 pandemic. Since April 2020, this online mode of teaching contributed a lot in delivering modules to Msc students

“Although the pandemic has brought challenges, teaching and learning at ACEDS kept moving smoothly due to the introduction of online teaching and learning method”



in Data Science but some lecturers and students experienced hard time with the new mode of teaching and learning.

The African Centre of Excellence in data Science deemed necessary to equip faculty staff with skills to cope with this new teaching method and organized a five-day training on the new method. In this framework, 16 lecturers were trained on online module design, how to teach and upload materials on E-learning platform and how to conduct online class management and assessment.

During the five-day training, participants designed the modules for online teaching and learning, uploaded them in UR-E learning platform and got skills on how to manage and control interactions and class attendance. This has been also the opportunity to familiarize with the newly introduced UR E-learning platform.

Although the pandemic has brought challenges in teaching, teaching and learning at ACEDS kept moving smoothly due to the

introduction of online teaching and learning method.

Master students from Energy Centre complete their internship; hail the Centre for this new practice



Students were visited by lecturers at their internship sites

The second cohort of Master students from African Centre of Excellence in Energy for Sustainable Development (ACEESD) have welcomed the initiative of organizing and facilitating the internship to the final students which was considered as an added value to their 'take home' after completing their studies.

40 Master students have completed their internship in different industries countrywide with energy-related services where they got practical skills in energy generation and supply as the core component of their studies.

The one-month internship was organized in a bid to equip final students with more practical skills additional to theoretical skills they learnt in class. Students who conducted this internship have appreciated the initiative that allowed them to practically witness different functionalities behind energy generation and supply.

"I recommend that the Center keeps on organizing this internship for all final - year students. With this, the Centre can be sure student gets out of school with full package both theoretical and practical"

Marie Solange Nikuze, a final student specializing in Energy economics conducted her internship at Mata Tea Company in Nyaruguru District, Southern Province. She testified that she witnessed how the energy used in the factory is generated, challenges associated to it and be able to propose possible solutions. "I am linking the theory I learnt in class with the practical exercises.

Here they are using firewood to generate energy. This has challenges mainly deforestation. I am analyzing its cost benefit and its sustainability. I will be able to have some points that I can recommend to the concerned institution to take into consideration in future as remedy to some challenges they are facing", she said.

Jean Claude Nahimana is another final-year student in Electrical Power Systems. He conducted the internship at The Energy Utility Corporation Limited (EUCL), Huye branch. As part of the practical experience he got, He came to identify different devices used in energy and how they are practically operated.

"For instance, a lot of devices that we learnt in class are physically found here. In class, you will not find for instance power transformers, but here you get to know them clearly and how they practically operate", he said.

"I recommend that the Center keeps on organizing this internship for all final - year students. With this, the Centre can be sure student gets out of school with full package both theoretical and practical", he added.

Nahimana is much appreciative to daily guidance and coaching he was provided by the EUCL management team he was working with, which, he says, made his internship more fruitful. Before ending their internship, all students were paid visit by their academic lecturers to access the challenges they are facing for future improvement.

Meet the first three PhD candidates who defended their theses under UR-ACEs (ACEITLMS)



ANGEL MUKUKA
Specialized in Mathematics Education

Angel Mukuka, Joseph Njiku and Kizito Ndiokubwayo are the first PhD candidates to complete their PhD journey at the African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science and become the first from UR-based African Centres of Excellence.

From Zambia, Angel Mukuka's research addressed a badging issue of Low achievement levels in Mathematics among selected secondary school students of Ndola District in the Copperbelt province of Zambia. Mukuka focused on investigating the effects of the Student Teams-Achievement Division (STAD) model of cooperative learning on

students' mathematical reasoning (MR) and self-efficacy beliefs (SEB).

Mukuka argues that, the Centre has facilitated his research to be able to come up with valid findings.

“ Having had an opportunity to get training in different countries for my first and second degrees, I can attest that, ACEITLMS as an institution stands out in its unique sense in academia. The student exchange program, which took me to the Homi Bhabha Centre for Science Education in Mumbai, India is the epitome of professional growth.”

“Having had an opportunity to get training in different countries for my first and second degrees, I can attest that, ACEITLMS as an institution stands out in its unique sense in academia. The student exchange program, which took me to the Homi Bhabha Centre for Science Education in Mumbai, India is the epitome of professional growth”, he said.

He added, “The invaluable lessons I learned from fellow PhD students and distinguished scholars from India and other parts of the world added real value to my research prowess enabling me to publish 5 research papers from my thesis in conference proceedings and reputed journals indexed by Scopus and Web of Science, among others”.



JOSEPH NJIKU

Specialized in Mathematics Education

Joseph Njiku, from Tanzania, another candidate who specialized in Mathematics education was interested on the effects of professional development activities on secondary mathematics teachers' technology integration competencies.

His research was built on the view that for effective technology integration in education in the ever-increasing technology access environment, teacher competencies such as their knowledge and attitudes towards technology integration are vital, hence must be developed and improved.

After conducting a research, findings showed that school-based design teams are effective in

developing teachers' technology integration competencies.

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"The journey involved various pieces of training that equipped me with the skills I need for research. Although the journey was difficult, with determination and support from the Centre, my supervisors, and colleagues I was able to complete my work", he said.

Njiku testified that his achievement was made possible by the Centre's collaboration in training with regional and international institutions that provide a pool of expertise of international perspective.

"This collaboration brings to the campus academics and researchers with diverse experiences and backgrounds, which makes the Centre a good place for postgraduate studies in mathematics and science education in the region.

It is a place that challenges students to set foot on quality research and publishing in unique way while making each one of them believe that they can", he reiterated.



Kizito NDIHOKUBWAYO
Specialized in Physics Education

Kizito Ndiwokubwayo from Rwanda is specialized in Physics education.

His study involved teachers and students in upper secondary schools in Kigali and the Eastern Province whereby he observed teaching and learning activities they undergo. He found out that the new curriculum is well implemented, although some gaps still exist.

The gaps that he identified include being guided by constructivism theory [starting from what learners know], the need to increase higher-order thinking skills [using Bloom domain level], and use of instructional tools [to improve conceptual understanding of students].

Thus, to remedy the last, he employed

Colorado Boulder's interactive PhET simulations and YouTube videos and implemented them into the classroom.

“ I am amazed by studying under the ACEITLMS program! It was easy to collect data on the spot. I have met with various and international experts during their presence in Rwanda and experienced researchers during my stay at the University of Kansas under the exchange program”

“Teachers appreciated their availability and effectiveness has risen in improving students' understanding of light phenomena. The tested instructional tools can initiate Rwandan

teachers in improving the quality of their routine teaching”, Ndiwokubwayo said.

Like his fellow researchers, he attributes his success to the Centre collaboration with international research experts.

“I am amazed by studying under the ACEITLMS program! It was easy to collect data on the spot. I have met with various and international experts during their presence in Rwanda and experienced researchers during my stay at the University of Kansas under the exchange program”. He added.

Ndiwokubwayo availed a valid and reliable tool for teachers for assessing their students' learning. He said that the study results will inform researchers and policymakers on the way to go.

www.aceitlms.ur.ac.rw

CALLS FOR APPLICATION



African Centre of Excellence in Data Science (ACEDS) calls for applications to different Master and PhD programs in Data Science. For more details, visit: www.aceds.ur.ac.rw



African Centre of Excellence in Energy for Sustainable Deveopment (ACEESD) calls for applications to different Master and PhD programs in Energy. For more details, visit: www.aceesd.ur.ac.rw



African Centre of Excellence in Internet of Things (ACEIoT) calls for applications to different Master programs in Internet of Things. For more details, visit: www.aceiot.ur.ac.rw

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

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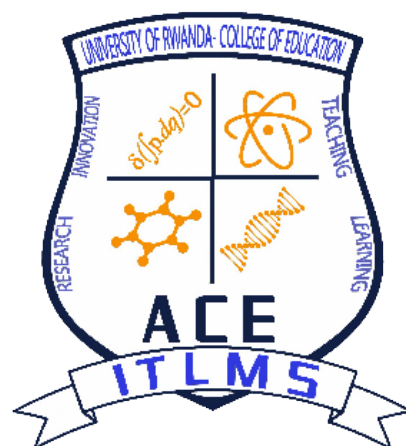
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