



CEDAT

Newsletter

Jul—Sept 2021

MINISTER UNVEILS LOCALLY-MADE DIESEL ENGINE



It was a show of innovations geared towards mechanisation of farming processes as the Minister for Science, Technology and Innovations, Dr. Monica Musenero, launched locally made engines today August 19, 2021.

A team of researchers from the African Centre of Excellence for Material science and nanotechnology (MAPRONANO) partnered with artisans from Kevoton Engineering, to design and assemble a diesel engine, the first of its kind in Uganda.

It is a single cylinder 4 stroke engine with 13 horse power and consumes 1 litre of fuel per hour. The engine is a water-cooled and therefore does not heat up.

The engines are able to run a generator and a water pump to facilitate irrigation on farms. The generator, is single phase and can therefore be used to power home appliances and small workshops.

According to Mr Mubiru Rogers of Kevoton Engineering, work on the engines started in 2017, but they were not able to make much progress until 2019 when they partnered with MAPRONANO ACE. The centre of excellence was then able provide training and technical advice, designing and student attachments to the project.

The Minister commended the MAPRONANO team, led by Prof. John Baptist Kirabira, for various innovations that the team in churning out, which included a sanitizer made in Makerere, solar panel slasher, and a mini tractor.

Dr. Musenero challenged researchers to have a mindset change and also change the pedagogy to reposition theory to practical works. “We need to teach the students knowing that they are going to design and develop an engine or a brake system,” Dr. Musenero emphasised. She

encouraged innovators to ensure their products do not stay on the selves, saying the biggest role of science and innovation is economical. The Minister said, for this reason, PRESIDE which she chairs focused on equipping laboratories in universities so as ensure that scientists receive the facilitation that they require. “Research is like a river which needs an outflow and the Ministry is here to provide that outflow,” she said.

She advised the university to prioritise certain areas of research when it comes to grants instead of awarding small grants to different projects which only end up being a drop in the ocean. Dr. Musenero thanked the President for his continued support and belief in science and technology.

The minister advised that the prototypes be refined so that they are genderised to

allow women to be able to operate the generator and water pump.

The Vice Chancellor, Prof. Barnabas Nawangwe, called on the minister to support the introduction of an innovation park in Makerere University, saying the park would be able to spinoff companies. Giving an example of Instabul University, the Vice Chancellor said the university has been able to produce 300 companies over the last one year, saying Makerere University should be supported to do the same.

The Vice chancellor also called for a mindset change, saying that like the Koreans, we too will be able to build our car industry by contributing different components of the vehicle and as such contribute to the economic development of the country. Prof. Nawangwe told of Korea's journey to car manufacturing. He shared that the Korean had sought help from Japan but Japan had declined to help. They then embarked on building their own engines and today, Korea is one the biggest car manufacturers. With hope and pride, he said scientist in Uganda have the potential to industrialise this industry. He called on senior researchers to mentor the students in order to create sustainability.

Prof. Nawangwe thanked the Minister for government's continued support especially through PRESIDE. The College of Engineering, Design, Art and Technology recently received an electron microscope worth over Shs2 billion from PRESIDE. This equipment will go a long way in growing research and innovation in the country.

"Makerere University is ready to work with the government to change our economy and contribute to its

development," he added.

The vice chancellor also thanked Prof. Kirabira for spearheading innovation at the college.

Also present at the launch was the Director of Research and Graduate Training, Prof. Buyinza Mukadasi, The Deputy Principal of CEDAT, Dr. Venny Nakazibwe, The Dean of the School of Engineering, Dr. Dorothy Okello and the Principal of the College of Engineering,

deal with industrial value chain.

She said these think tanks will put scientists at the centre of the Ministry of Science, Technology and Innovation. Dr. Musenero advised that for everything we set out to do, we must be purposeful, work together and forget competition among universities or individual. She called for Obuntu and have the right mindset and ideology.



Minister, Dr. Monica Musenero tests the locally made tractor at the exhibition

She tasked the Chairperson of the travel economy think-tank, Eng. Musasizi to draft a proposal on how the engine prototype can be improved and commercialised.

OTHER INNOVATIONS

Solar Panel Slasher

The slasher uses solar and has a rechargeable battery of 75 wats. It can be used by farmers to cut shrubs as well as

domestic use in slashing compounds. Away from farming, it can be used to run small appliances and light up a house. Its portable machine and easy to maintain.

Mini Tractor

This was designed to make it easy for farmers that can not afford heavy duty tractors. It runs on petrol. One litre of petrol can run the tractor for 3 hours making it cheap to maintain. In its state, it has a plough and speed planter which can be attached to it.

The innovators plan to improve it to have other garden tools to it, such as spray pumps, and a weeder. The tractor will go a long way in mechanizing farming.

Story by Betty Kyakuwa

Design, Art and Technology, Prof. Henry Alinaitwe who thanked the Minister for her love and enthusiasm for science and technology. He too thanked her for the equipment that the college recently received under the PRESIDE project.

The Minister, in concluding remarks informed the public that the Ministry had changed its operations and had brought on board scientists to in think-tanks to help grow the Ministry's agenda.

The National Engineering Think-tank, which is led by CEDAT's own Prof. John Baptist Kirabira

Travel Economy Think-tank

This think tank is tasked with mobility and it is headed by Eng. Paul Isaac Musasizi

Beauty and Apparel Think-tank

Digital Economy Thinnk-tank

Agro Economy Think-tank, which will

Press Release: Completion of Semester One 2020/ 2021 Examinations



At the time H.E President Y.K.T. Museveni declared a lockdown effective Friday 18th June 2021, Makerere University students were doing examinations.

Subsequently, several meetings were held as well as consultations with stakeholders to come up with alternative modes of assessment for completion of Semester One 2020/2021 examinations.

The University Senate and Council have approved the Alternative Modes of Assessment for the completion of Semester One 2020/2021 examinations.

College/School Academic Boards have met, reviewed, selected and submitted the most appropriate alternative modes of assessment for the respective programmes/course units.

The University has scheduled the Examinations to start on 13th September, 2021 and run up to 30th September, 2021. First Year and Continuing Students who have pending Semester One examinations are informed

accordingly and should prepare to sit the examinations.

Colleges/Schools have drawn-up and published detailed examination schedules and timetables. College Registrars have been requested to work with Deans, Heads of Departments and Examination Coordinators to display and publicize the detailed examination schedules and timetables. In addition, Deans/ Heads of Department/College Registrars should provide relevant information and sensitize students on these examination modalities.

Students who have not completed payments of relevant fees should contact the respective College Bursars to be guided on the new payment procedures. Those who have not registered should contact the College Registrars for guidance.

[You may download the press release here](#)

Eng. Dr. Dorothy Okello re-Appointed Chair of UCC Board

Eng. Dr. Dorothy Okello, the Dean of the School of Engineering, CEDAT has been reappointed as the Chairperson of Uganda Communications Commission Board. The announcement of the UCC new board was made by the Executive Director, Irene Kaggwa Sewankambo through her twitter account on Tuesday 1st September 2021.

Her tweet read “Eng. Dr. Dorothy Kabagaju Okello assumes office as chair person of the Board of @UCC_Official during the inauguration of the new Board by Honourable @CHRISBARYOMUNS1 in the presence of Hon. @KabbyangaB and the PS of @MoICT_Ug Dr. @azawedde”

The students and members of staff College of Engineering, Design, Art and Technology congratulate Dr. Okello upon her reappointment to this post.



Eng. Dr. Dorothy Okello poses for a photo with ICT Minister Hon. Chris Baryomunsi



VC CALLS FOR MORE RESEARCH IN CEDAT

The Vice Chancellor, Prof. Barnabas Nawangwe, has called on staff of the College of Engineering, Design, Art and TEchnology to engage in more research and apply for grants.

Group photo of workshop participants

Prof. Nawangwe was speaking during a one-day pedagogical training for the staff of the Department of Architecture and Physical Planning. The Vice chancellor commended the department for the great work of teaching students but also called on them to engage more in research. “We are beginning to see urbanization so this is a good time for you to engage in research,” he said. He encouraged staff to apply to the Makerere University Research and Innovations Fund (RIF) for research grants.

He advised that climate change and issues of energy should be of interest to the Architects and planners to investigate and advise policy makers. On teamwork, the VC advised staff to respect authority and support their leaders. He advised that it was important for the department to have teamwork and shared goals. “What is the philosophy of the department?

What are the pertinent issues you must address?” he questioned. If these questions are answered, the VC said, the department was destined for greater things. “There is nothing greater than teamwork and Integrity,” he added.

Prof. Nawangwe shared the story of the beginning of the Dept. of Architecture. The dept. was started by Prof. Nawangwe, and 2 other people and because of teamwork, they were able to graduate one student with a first-class degree from a group of 8 students who enrolled that year. Architects had previously been trained in Nairobi and Soviet Union, present day Russia.

The Principal of CEDAT, Prof. Henry Alinaitwe, called on staff to attract students for the masters courses, saying Msc Architecture had failed to attract any applicants this year. He said this would affect the promotion of staff because they will not be supervising students. He called for a mindset change and advocated positive attitude to work.

The Head of Department, Dr. Tamale Amin Kiggundu highlighted the challenges that the department was

facing. These included poor performance of students, students transferring from Architecture to other courses and lack of enrollment at MSc level. It is against this background that the department saw it fit to hold a pedagogical training, with the hope that this will help staff and students of the department.

The training was conducted by Dr. Julian Kasirye, who called on the staff to make sure they appeal to the 3 domains of teaching; 1. Cognitive Domain; 2. Psychomotor Domain, 3. Affective Domain.

The Deputy Principal, Dr. Venny Nakazibwe thanked the VC for making the time to officiate at the training and also appreciated the staff that had made it for the training. She thanked the trainer and encouraged staff to put in practice all that they had learnt during the training. “I hope that we shall be the change that we want to see,” she emphasized.



CEDAT Unveils State-Of-The-Art Scanning Electron Microscope

The Minister for Science, Technology and Innovation, represented by Dr. David Seruka, a Senior Research Associate at the Ministry on July 21, 2021 commissioned a state-of-the-art Scanning Electron Microscope recently installed at the College of Engineering, Design, Art and Technology.

The new equipment, procured by the government at Shs2.6 billion will help researchers undertake studies and investigations in Materials, Nanotechnology, drug analysis, forensics and biomedical Engineering, among other things.

The grant to procure the equipment was won by Africa Center of Excellence in Materials Product Development and Nanotechnology (MAPRONANO ACE). The equipment was procured under the Presidential Initiative on Epidemics (PRESIDE) a platform set up by the President in march 2020 to fast track local research and development to develop epidemic response tools.

The head of the Africa Center of Excellence in Materials Product Development and Nanotechnology

(MAPRONANO ACE), Professor John Baptist Kirabira, said the equipment can be used in analysis of materials for production of medicine, vaccines, forensic examinations from crime and accident scenes, gene analysis among many others.

Prof. Kirabira said the equipment is special because it can give images and analysis at a very high magnification which can not be done by ordinary microscopes. He said, many people were transporting samples to South Africa and Europe, which is costly. "Now researchers can save this money and instead do their tests at Makerere." He invited researchers from all other universities as well as the region to take advantage of this equipment.

Dr. Seruka said PRESIDE was to support research and Development efforts by focusing on priority areas of diagnostics, therapeutics, vaccines, pandemic materials like masks, and epidemiological data. He said the scanning electron microscope is the first of its kind in sub-Saharan Africa. He said, researchers and analysts will

no longer travel out of the country to analyze specimen because this machine will be available at Makerere University

The Vice Chancellor of Makerere University, Prof. Barnabas Nawangwe, thanked the president for his continued support to research and innovation and promised that Makerere University would continue to undertake ground breaking research in health, biomedical engineering, Materials science and contribute to addressing the challenges of the country. He challenged researchers at the university to use this equipment to come up with different vaccines that will help our communities.

He advised the college to charge a small fee to the users so as to ensure proper maintenance of the equipment.

The Principal of the college, Prof. Henry Alinaitwe, also thanked the government for its continued support to CEDAT and science, technology and Innovation at large. He called on staff of the university to make good use of the equipment and carry out research to solve community challenges.



Students showcase innovations at HEPSSA workshop

Despite the challenges brought on by the Covid 19 pandemic, students and staff of CEDAT have continued to exhibit excellence in innovations to address different challenges. This was witnessed during a 2-day online workshop organized by the Higher Education Partnership for Sub Sahara Africa (HEPSSA) Project on July 15th -July 16th 2021. The project, funded by the Royal Academy of Engineering supports different activities including curriculum review and problem-based learning in institutions of higher learning. Also supported is registration of Intellectual Property, university-Industry staff exchanges, workshops, conferences and training in Engineering Education.

The project is being undertaken by different universities including Makerere University, Kyambogo University, Mbarara University of Science and Technology, Busitema

University, Ndejje University, Moi University, Dar es Salaam University and University of Leeds in the UK.

The HEPSSA project Aims at creating partnerships that will help in Enriching Engineering Education and contribute to engineering capacity development in the region. It also seeks to improve the quality and relevance of engineering education and research in SSA. These Improvements should be made by catalyzing industry -academia partnerships in 'hub' universities and their partner institutions.

It is envisioned that the project will ensure that the graduates are more practical and relevant in addressing challenges in society, Partnerships with industry for mutual benefit, Increased collaboration

among universities, Increased research and grants won, Ability to acquire intellectual property rights and commercialization of innovations.

Innovations that have come out of Problem Based Learning Model

Sanitary Pads made from Bamboo and paper

Many students in the rural areas are forced to leave school when they start their menstruation cycle. This is because they can not afford the sanitary towels/ pads on the market. To this end, students of CEDAT under the Problem Based Learning model have innovated sanitary pads made from bamboo. The aim of the research project is to supply healthy, hygienic re-usable pads to girls at a low price than the plastic sanitary towels sold in supermarkets.

The bamboo is mixed with recycled paper to act as an absorbent. Bamboo fabric is used on the exterior of the pads because of its naturally anti-bacterial and anti-fungal characteristics.

Research has also shown that Bamboo fiber is 30% more absorbent than the finest cotton.

The project code named G-Pads also aims at reducing on the plastic in the environment due to dumping of disposable sanitary towels made of plastic materials.

The project is addressing some SDGs in relation to the environment. The research will help in reduction in plastics dumped in the environment and reduction in emission of greenhouse gases contributing to global warming. It is expected that if commercialized, the innovation will create employment for many people.

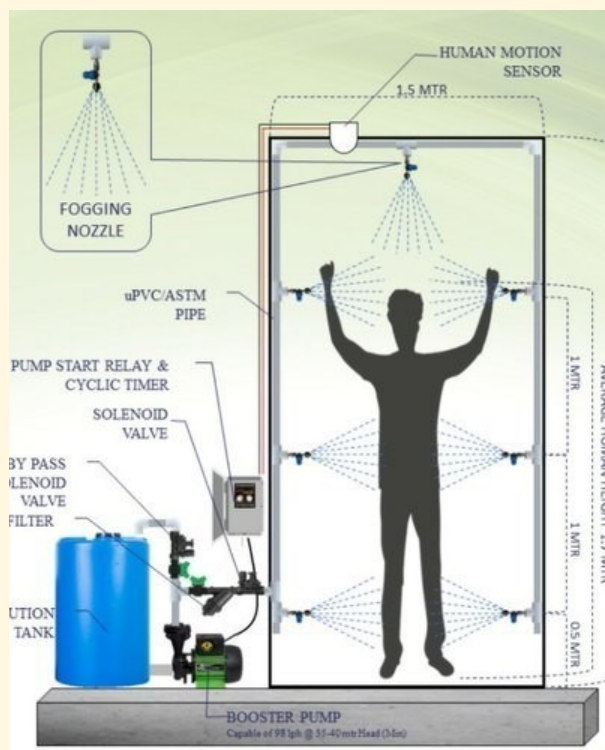
R-Husk Bioplastics

Another team of student is making food containers from rice husks and cassava.

The process:

1. Rice straw will be milled and sieved to ensure uniform size of <2mm.
2. Mixture of waste recycled paper and cassava starch will be blended together in presence of water.
3. The milled rice straw will then be added.

4. This mixture will then be thermoformed for about 4 min at about 180 C.
5. The starch will transform into thermoplastic starch creating a



foamed material and silica present in the rice straw will impart its hydrophobic (water repelling) properties onto the composite formed.

The container is biodegradable and therefore environmentally friendly.

Medicine Delivery and Patient Monitoring system

A team of medical students and Engineering students have teamed up to innovate a machine that dispenses medicine to patients. This has been done in the wake of increase of Covid 19 infections among health workers. This has called for a need to minimize physical contact between the patient and the health worker and yet continue to monitor the health of the

patient. This innovation addresses both issues.

The machine has been designed to dispense medicine and also monitor the patient's vitals.

The main objective of the research project was To develop a system that ensures timely medicine delivery and relays patient symptoms data to medical personnel. The students have designed a Prototype that achieves timely and accurate medicine delivery and relays patients' state to the health workers.

Innovations in response to Covid-19 Pandemic

1. Solar powered sanitizer booth
2. Development and Evaluation of Nanobody-based Point of Care Diagnostic Kit for Detection Of Covid -19 in Saliva
3. Evaluation of nanoscale materials as candidate adjuvants and delivery systems for SARS CoV-2 sub unit vaccine in Humanized mice (Phase II)
4. Green Synthesis and Functionalization of Paramagnetic Nanoparticles for Viral RNA extraction
5. MAPRONANO ACE in partnership MakCHS developed an affordable hand sanitizer as a prevention measure for COVID 19
6. Portable Mask Sterilizing Pod, RIF
7. Solar Powered Sanitizer Booth
8. Bioactive nanocoated masks with antimicrobial activity

CEDAT in the Press (July—September. 2021)

Follow the links below to read stories written about CEDAT between July and September 2021.

- ⇒ [Musenero forms think tanks to boost innovation, economy \(Observer, September 2021\)](#)
- ⇒ [Here is how to help engineering education become more useful \(Observer, August 2021\)](#)
- ⇒ [Makerere acquires state-of-the-art Nanotechnology microscope \(New Vision, July 2021\)](#)
- ⇒ [Mak acquires 2.6b Covid Machine \(Daily Monitor, July 2021\)](#)

