H.E. GEN. YOWERI KAGUTA MUSEVENI

PRESIDENT OF THE REPUBLIC OF UGANDA

HON. JANET KATAAHA MUSEVENI

MINISTER OF EDUCATION AND SPORTS

PROF. FRED WABWIRE MANGEN

CHAIRPERSON OF COUNCIL

KYAMBOGO UNIVERSITY

PROF. ELI KATUNGUKA RWAKISHAYA (PhD)
VICE CHANCELLOR
KYAMBOGO UNIVERSITY

ANTHEM

NATIONAL ANTHEM

Oh, Uganda! may God uphold thee,
We lay our future in thy hand;
United, free for liberty
together we'll always stand.

Oh, Uganda! the land of freedom,
Our love and labour we give;
And with neighbours all
At our country's call
In peace and friendship we'll live.

Oh, Uganda! the land that feeds us,
By sun and fertile soil grown;
For our own dear land,
We'll always stand,
The Pearl of Africa's Crown

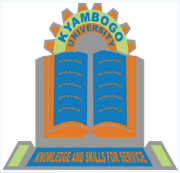
EAST AFRICA ANTHEM

1. Ee Mungu twaomba ulinde
Jumuiya Afrika Mashariki
Tuwezeshe kuishi kwa amani
Tutimize na malengo yetu.

Chorus
Jumuiya Yetu sote tuilinde
Tuwajibike tuimarike
Umoja wetu ni nguzo yetu
Idumu Jumuiya yetu.

2. Uzalendo pia mshikamano
Viwe msingi wa Umoja wetu
Natulinde Uhuru na Amani
Mila zetu na desturi zetu.

3.Viwandani na hata mashambani
Tufanye kazi sote kwa makini
Tujitoe kwa hali na mali
Tuijenge Jumuiya bora.



KYAMBOGO UNIVERSITY ANTHEM

1. Oh Kyambogo University
What a mighty centre you are!
Behold to you we entrust our future today.
Abound in Skills and Knowledge,
You freely and truly give out,
For the nation's growth and progress
We surely shall succeed.

Chorus
Kyambogo University we are proud of you
For the mission straight, for the vision so
bright And the effort to provide the skills
To the young and the old,
In education, science and other fields
Beyond the scope, the scope prevalent.

2. The pillars that you're made of,
Strong and firm all they stand,
So vast, so versed, so focused in all that they do.
Their great strength notwithstanding
You goals remain so distinct
Your vision, such a marvel
To us and to all.

WORD FROM THE VICE CHANCELLOR

PROF. ELI KATUNGUKA RWAKISHAYA (PhD)

I welcome you once again to Kyambogo University, for Science, Technology, Engineering, Arts, and Mathematics (STEAM) Festival Fourth Edition 2025. The theme of this Festival, "Demystifying Science, Technology, and Innovation for Community Development," reminds us of the need for all stakeholders to ensure that outputs of research and innovation do not remain in laboratories and library shelves; but rather, must be used as tools that drive socio-economic development and improve livelihoods of our communities. Our discussions and engagements for this year's Edition will mainly focus on three critical areas:

1. Transforming Education into a Catalyst for Deep Tech Innovations.

2. Driving Green Mobility in Uganda through Public-Private Collaboration.

3. Enhancing Quality and Innovation for Globally Competitive Agro-Products.

This year's Edition marks our Fourth celebration of STEAM disciplines since inception in June 2022. Each year, we strive to elevate the bar by showcasing new trends in research and innovation.

I would like to extend sincere gratitude to our esteemed guests, including government, policymakers, educators, students,

and industry who share our passion for science, technology, innovation and education. Your participation enriches our discussions and contributes to a collaborative atmosphere where we promote and advance knowledge and skills for service to our community.

As we navigate through the current challenging times, the importance of research and innovation has never been more evident. From addressing global challenges such as pandemics and climate change, to exploring the solutions to issues of food and nutritional security, it is becoming more evident that research and innovation are at the forefront of human progress and well-being.

STEAM Festival therefore, is here to reveal the commitment of Kyambogo University to knowledge generation, exploration and community service. The Event continues to bring together academia, industry, government, secondary schools, media, and the public to display research and innovation projects that have the potential to shape our world.

I would like to invite you to explore the exhibitions, engage with the presenters, and participate in the discussions in order to maximize from the benefits of the Event.

Prof. Eli Katunguka Rwakishaya (PhD)
VICE CHANCELLOR
KYAMBOGO UNIVERSITY

WELCOME REMARKS FROM THE CONVENER

Associate Professor Ediriisa Mugampoza (PhD)
DEAN, FACULTY OF SCIENCE

I send you warm greetings from Kyambogo University and welcome you all to the Fourth Edition of the Science, Technology, Engineering, Arts and Mathematics (STEAM) Festival. I would like to extend our heart-felt greetings to all our guests and participants who are joining us for this year's celebration of STEAM disciplines.

Every year, the STEAM event brings us great joy to witness the many days of planning from our partners and contributors. We now all appreciate that Science and Technology supported by other fields of Humanities, are at the forefront of human progress, driving innovation and shaping our understanding of the world, as we know it. STEAM Festival serves as a platform to honor the spirit of collaborative (with Humanities) scientific inquiry and to highlight the remarkable achievements and advancements in the various fields exhibited.

From Thursday 10th to Friday 11th April 2025, our programme will give you the opportunity to engage with leading researchers, educators, and innovators who are at the forefront of discovery and creation of new knowledge. Through interactive exhibitions, engaging presentations, and thought-provoking discussions, I would like to assure that everyone one will enjoy and learn something.

We hope that your experience from this Festival will inspire your mind of curiosity, creativity, and critical thinking in order to ignite your passion for research and innovation, especially among our young people.

Lastly, I would like to express our heartfelt gratitude to our sponsors, partners, volunteers, and participants for their invaluable support and contributions in making this event possible. Your dedication to this event is truly acknowledged. We are very grateful to Kyambogo University Council and Management for providing funding for this Festival every year.

I wish you all a truly enriching experience at our Fourth Edition of STEAM Festival.

Knowledge and Skills for Service
For God and my Country

Associate Professor Ediriisa Mugampoza (PhD)
DEAN, FACULTY OF SCIENCE

On Behalf of the Organizing Team

STEAM BACKGROUND

The Kyambogo University Science, Technology, Engineering, Arts and Mathematics (STEAM) Festival is a pioneering initiative launched by the Faculty of Science in 2022 to foster a culture of scientific inquiry, technological advancement, and innovation-driven solutions for societal development. It serves as a dynamic platform for knowledge sharing, research dissemination, and showcasing transformative innovations from various disciplines within the university.

Originally, the Festival focused on Science, Technology, Engineering, Agriculture, and Mathematics (STEAM), aligning with global priorities in STEM education and innovation. However, recognizing the interdisciplinary nature of problem-solving in today's world, the scope of the Festival has expanded to incorporate other fields of Arts and Humanities, Management, Vocational Studies and Special Needs Education, which are other areas of expertise at Kyambogo University that significantly contribute to technological advancement and inclusive innovation.

Beyond academic engagement, the STEAM Festival plays a strategic role in bridging academia with industry, policymakers, and local innovators. It provides an avenue for the recognition and strengthening of existing partnerships while catalysing new collaborations with stakeholders from government agencies, research institutions, and private sector. This ecosystem-driven approach ensures that the knowledge generated within the University is not only preserved within academic circles but also translates into real-world applications, driving national development through science and technology.

By bringing together students, researchers, entrepreneurs, and industry experts, the Festival demystifies science and innovation, making it accessible and applicable to community needs.

It also fosters an entrepreneurial mindset, encouraging young scientists, engineers and technologists to develop solutions that address critical societal challenges in areas such as green technology, artificial intelligence, sustainable agriculture, and digital transformation.

As the Festival continues to grow, it remains committed to enhancing Uganda's capacity for scientific discovery, innovation, and industrial competitiveness, positioning Kyambogo University as a hub for research excellence and technological leadership in the region.

Goal of the Festival

The main goal of the Festival is to develop an appreciation of the role of science, technology and innovation in community development by bridging the gap between knowledge creators and knowledge consumers.

Objectives of the Festival

1. To inspire young people into science, technology and innovation, and to create a sustainable pool of the next generation of scientists, technologists and innovators.
2. To empower researchers to identify areas of public interest and concern to which they can contribute.
3. To enhance access to scientific research and its applications.
4. To strengthen policy-focused research in higher institutions of learning.

Following the declaration by the Vice Chancellor and Chairperson of the University Council to hold the Festival annually, in order to emphasize the relevance of the University and its ability to generate knowledge to solving society problems, the Fourth Edition is here once again.

This Edition will include the following:

1. All Faculties and Schools are to participate, sharing short stories of their scientific, technological, or artistic discoveries through exhibitions, stories, music, dance, and/or roundtable

discussions.

2. Selected secondary schools, preferably from those that attended the previous Festival Editions, have been offered a stall to tell their stories too.

3. A website has been created to host all the information and material pre-, during, and post-STEAM Festival.

4. Given that in the previous Festival Editions, few postgraduate students and staff participated in the exhibitions and talks, a one-day STEAM Conference has been organized to encourage staff and postgraduate students to disseminate their Competitive Research Grant findings. In addition, participants have been trained in science communication skills to lower their scientific/ academic ideas to a popular article style that could be published on the STEAM Festival website.

5. Public Universities that receive Research Grants from Government have been invited to share their findings during the STEAM Conference to stimulate potential research collaborations between staff from the various institutions. This is intended to inspire joint applications for international research grants.

6. Research and International Documentation: Science Festivals are rare, poorly funded and poorly documented in Africa. A research project intended to highlight the experiences, challenges, and way forward for such events has been conducted during the preparation and implementation of the Festival. This is intended to share the curiosity and wonders that the Kyambogo University STEAM festival has brought to the young people of Uganda, as we look forward to building science and innovation-led economic growth.

7. Potential undocumented science collaborators from the informal sector: Young Ugandans have innovations that many of us have enjoyed but have never given deep thought about. An example is what happens in Katwe, a place where many people have made livelihoods through scientific discoveries and innovations that are unfortunately undocumented.

We have provided a platform to some of these innovations to exhibit with us during this year's Edition of STEAM Festival.

Subthemes for the 4th Edition of STEAM Festival:

1. Transforming Education into a Catalyst for Deep Tech Innovations:

The future of Uganda's prosperity lies in building an education system that inspires the creation of cutting-edge technologies and solutions that can compete on the global stage. Deep Tech encompassing fields such as artificial intelligence, biotechnology, robotics, nanotechnology, Internet of Things, and quantum computing offer a unique opportunity to address complex societal challenges while driving economic growth. To foster such innovation, our education system must evolve beyond traditional instruction to become an engine of creativity, problem-solving, and interdisciplinary thinking. We hope that the discussion under this subtheme will create an entrepreneurial mindset, positioning Uganda as a leader in Deep Tech and unlock a future where our students and staff not only adapt to global shifts but become pioneers of transformative change.

2. Driving Green Mobility in Uganda through Public-Private Collaboration: The journey towards sustainable transportation is gathering momentum in Uganda, with investments in green mobility solutions such as electric vehicles, solar-powered transport, and locally assembled eco-friendly bikes.

However, these innovations have yet to reach their full potential in transforming the mobility landscape. To bridge this gap, there is a need for stronger synergies between the public and private sectors to enhance awareness and community engagement in this subsector.

This STEAM Festival offers a platform for innovators, industry, policy makers, and students to explore what is working, identify challenges, and co-create solutions, and inspire new ideas that can shape Uganda's future of sustainable transport.

3. Enhancing Quality and Innovation for Globally Competitive Agro-Products: Our agriculture sector holds immense potential to drive economic growth, with products such as coffee, cocoa and spices sought after worldwide.

However, despite producing high-quality goods, some of our exports have faced rejection in international markets due to non-compliance with global standards. This challenge presents an opportunity to rethink how we approach Agro-production by creating a platform for collaboration between farmers, researchers, industry and policymakers to unlock new ways to improve product quality, align with global expectations, and strengthen market access. We hope that this will create resilient supply chains positioning Uganda as a leader in the global agro-industry, ensuring that our products are not only accepted but celebrated on the world market.

STEAM CONFERENCE:
Theme: 'Advancing Research and Innovation for Impact'

Purpose of the Conference
The STEAM Conference has been organized to consolidate insights from the Festival, evaluate research progress, and strategize ways to translate knowledge into practical solutions for socio-economic development, environmental sustainability and technological transformation.

Objectives of the Conference
1. To enhance research commercialization.

2. To build capacity in science communication and policy formulation.

3. To promote collaborative Research and Innovation Development.

4. To track the impact of STEAM innovations in society.

Key Activities

1. Oral presentations: Some key researchers have been selected for oral presentation of innovative findings from their researches funded by Competitive Research Grants Ad hoc Committee

2. Poster presentations: Some key researchers have been selected for Poster presentation of innovative findings from their researches funded by Competitive Research Grants

3. Policy Roundtable Discussions: this has been organized to engage government agencies to integrate research findings into national development strategies.

4. STEAM Innovation Impact Report: A compiled analysis of breakthroughs, challenges and recommendations for the next Edition.

5. Workshops on Deep Tech, Green Mobility, and Agro-Innovation: this has been organized to build on the Festival's subthemes with expert-led discussions.

Expected Outcomes of the Festival

1. Strengthened academia-industry-government linkages for applied research and commercialization.

2. Increased joint grant applications for funding research and innovation projects.

3. Creation of policy recommendations based on STEAM discussions.

4. Publication of a Post-STEAM Research Digest to document findings and highlight key innovations.

Organizing Committee of the 4th Edition of the STEAM Festival April 2025

Overall Chairperson
STEAM Festival
Assoc. Prof. Mugampoza Ediriisa

Coordinator
STEAM Festival
Dr. Savannah Nuwagaba

Chairperson
STEAM conference
DR.ANNE NAKAGIRI

COMMITTEE MEMBERS

S/N	Task	Responsible person(s)
	Host	Prof. Eli Katunguka – Rwakishaya, Vice Chancellor, Kyambogo University
	Convener	Assoc. Prof. Ediriisa Mugampoza, Dean, Faculty of Science
	Overall Coordinator	Dr. Savannah Nuwagaba, Department of Mathematics and Statistics
	Convener of Competitive Research Grants Dissemination/STEAM Conference	Dr. Eng. Anne Nakagiri, Director, Research Office
	Secretariat	1. Ms. Viola Nabuzale 2. Ms. Ruth Nalumansi 3. Ms. Ketty Namono
	Sub-committees	
1	Abstract Review	1. Dr. Frederick Kanobe 2. Dr. William Wanasolo 3. Dr. Kimuli Philly Ivan 4. Dr. Nuwagaba Savannah 5. Mr. Peter Serubidde
2	Director of Ceremonies	1. Mr. Reuben Twinomujuni 2. Dr. Richard Awichi Opaka
3	Protocol / Press/STEAM Booklet	1. Ms. Jennifer Sibbo 2. Ms. Evas Tumusiimire
4	Rapporteurs	1. Dr. Kimuli Philly Ivan 2. Mr. Nabulele Moses
5	Exhibition Stalls	1. Dr. Herbert Mukalazi 2. Dr. Ivan Sekibenga
6	Catering/Welfare	1. Mr. Roderick Muhumure 2. Ms. Winnie Nakiyaga Muwanguzi 3. Ms. Stellah Nalumansi 4. Ms. Loyce Nahwera 5. Joanita Afoyoworth
7	ICT	1. Mr. Johnson Twinamasiko 2. Mr. Roderick Muhumure
8	Medical	1. Dr. Wycliffe Sebunjo 2. Ms. Winne Nakiyaga Muwanguzi
9	Security	1. Dr. Savannah Nuwagaba 2. Mr. Timothy Magezi
10	Ushers	1. Roderick Muhumure
11	Cleaners	1. Mr. Alone Mulinda 2. Mr. Victor Yiga
12	Fitness Sessions	1. Ms. Loyce Nahwera

PROGRAMME FOR STEAM FESTIVAL FOURTH EDITION APRIL 2025

DAY ONE: Thursday 10th April 2025		
Time	**Activities**	**Lead Person**
9:30 -9:50 am	Registration	
9:50 - 9:55 am	Opening prayer	Rev. Eng. Dr. Emma Mwesigwa
9:55 - 10:00 am	Opening remarks	MC
10:00 - 10:10 am	Opening remarks by the Chair Organizing Committee	Associate Professor Ediriisa Mugampoza
10:10 -11:40 am	Keynote Series:	1. **Muhumuza Allan** STI Secretariat, Office of the President 2. **Mr. Phillip Mukasa**, Mr. Ronald Kayima- Tech Anatomy Ltd., and Deep Tech Center of Excellence, Namanve 3. **Mr. Walter Upoki Umika**- SCOGEM Enterprises Ltd.
11:40 -12:00 pm	**TEA Break**	
12:00 -13:00 pm	Arrival of Chief Guest: Guided tour of exhibitions	**Dean, Faculty of Science**
12:00 - 13:00 pm	Panel Discussion:	1. **Mr. Gonahasa David**- STI Secretariat, Office of the President 2. **Mr. Phillip Mukasa** and **Mr. Ronald Kayima**- Tech Anatomy Ltd. and Deep Tech Center of Excelence, Namanve

		Mr. Walter Upoki Umika- SCOGEM enterprises Ltd. **Dr. Robert Mulebeke**, Dean Faculty of Agriculture, Kyambogo University
1:00 - 2:00 pm	**Lunch**	
	Official opening of STEAM Festival 4th Edition	**Mr. Twinomujuni Reuben**
2:00 – 2:10 pm	**Anthems;** Uganda, East Africa, Kyambogo University	**Mr. Twinomujuni Reuben**
2:10 – 2:15 pm	Prayer	**Rev. Eng. Dr. Emmanuel Mwesigwa**
2:15 – 2:25 pm	Overview of STEAM Festival	**Associate Professor Ediriisa Mugampoza (PhD)**
2:25 – 2:30 pm	Entertainment	**Dr. Isabilye James**
2:30 – 2:40 pm	Science Circus	**Mr. Kafeero Martin**
2:40 – 3:00 pm	Welcoming Remarks by the Vice-Chancellor	**Prof. Eli Katunguka - Rwakishaya**
3:00 – 3:30 pm	Speech by the Chairperson Council	**Prof. Fred Wabwire Mangen**
3:30 – 4:00 pm	Speech by the Chief Guest	**Hon. Dr. John Chrysestom Muyingo**
4:00 – 4:10 pm	Anthems; Kyambogo University, East Africa, Uganda.	**Dr. Isabilye James**
END OF DAY 1		
DAY TWO: Friday 11th April 2025		
9:00 -9:20 am	Registration	**Ms. Ruth Nalumansi**
9:20 - 9:25 am	Opening prayer	**TBA**
9:25 - 9:30 am	Opening Remarks	**Dr. Anne Nakagiri**

Session I		
9: 30 - 9:45 am	Application of Bacteriophages in the Management of Banana *Xanthomonas* Wilt	**Dr. Ritah Nakayinga**
9: 45 - 10:00 am	Harnessing Social Networking for Social Change: Opportunities and Challenges for Social Work Practice	**Mr. Wanda Yahaya**
10: 00 - 10:15 am	Design and Prototyping of a Dynamic and Cost-Effective Neonatal Incubator	**Roland Niwareeba**
10: 15 - 10:30 am	Strengthening the Links Between Industry and Academia for a Sustainable Textile Sector that Promotes Circular Economy in Sub Saharan Africa (METODIC)	**Dr. Mugaanire Tendo Innocent**
10:30 - 11:00 am	Saying, Being, and Doing in COVID-19 Sermons: The Case of the First National Prayers 2020	**Mr. Peter Sserubidde**
Session II		
11:00 – 1:00 pm	**Poster Session**	
1:00 – 2:00 pm	**Lunch Break**	
2:00 – 2:15 pm	Entertainment	**Dr. Isabirye James**
2:15-2:30 pm	Recap of the Festival from the Rapporteurs	
2:30 - 2:50 pm	Closing Remarks	**Dr. Onyutha Charles, Dean Faculty of Engineering**
2:50 -3:00 pm	Brief report by the BIC	**Dr. Gafuma Samuel**
3:00 – 3:10 pm	Closing Remarks by the Vice-Chancellor	**Prof. Eli Katunguka - Rwakishaya**
3:10 – 3:30 pm	Awarding Ceremony	**Adjudicators**
3:30 – 3:40 pm	Entertainment	**Dr. Isabirye James**
END OF DAY 2 & CLOSURE OF THE 4TH EDITION OF THE STEAM FESTIVAL		
END		

ABSTRACTS

Dynamic proximity load balancing scheme for edge computing environments

By, Mugerwa Dickson

Edge computing has emerged as a transformative paradigm to overcome the limitations of cloud computing for latency-sensitive and resource-constrained applications by bringing computation closer to the data source. This project presents a Dynamic proximity load balancing scheme for Edge Computing designed to optimize the allocation of microservices in dynamic edge environments.

The proposed scheme employs a novel dynamic load balancing algorithm that dynamically assigns tasks to edge nodes based on workload characteristics and real-time resource availability, minimizing latency and ensuring efficient resource utilization. By enforcing node capacity constraints and adapting to changing task demands, the scheme enhances scalability, availability, and performance. The proposed solution addresses critical challenges in Multi-Access Edge Computing (MEC), such as heterogeneous hardware, limited node resources, and dynamic workloads. Performance evaluation using key metrics, including latency, resource utilization, and throughput, demonstrates the framework's effectiveness in managing edge computing workloads. This approach provides a foundation for future enhancements incorporating predictive algorithms and energy-efficient strategies to further improve edge computing deployments.

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Saying, Being, and Doing in COVID 19 Sermons
The Case of the First National Prayers 2020

By; Peter Sserubidde

In their sermons, the women and men in charge of institutions and practice of religion said a lot of things during COVID 19 lockdown between 2020 and 2021. By saying whatever they were saying, what were they being? What were they doing? When we use language to communicate, we construct and reflect ourselves us being something/someone doing something. In return, we make our audiences to construe us and the world about which we are communicating in that way and perhaps prompt them to be, act or believe the same way.

In this paper, I use Gee (2011)'s Discourse Analysis Theory and Method to investigate what the preachers were saying, being and doing by their sermons during the unprecedented COVID 19 lockdown in Uganda. Were they healing and bringing hope to the masses or anxiety and horror?

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Harnessing Social Networking for Social Change: Opportunities and Challenges for Social Work Practice

By; Wanda Yahaya

Social networking has revolutionized the way people interact, communicate, and mobilize around social causes. As a social work and social administration student, it is essential to explore the potential of social networking as a tool for social change. This paper examines the opportunities and challenges of leveraging social networking platforms for social work practice. Social networking offers unparalleled opportunities for social workers to connect with students, clients, communities, and stakeholders. Platforms like Facebook, Twitter, and Instagram can be used to raise awareness about social issues, mobilize support for social causes, and provide online support services. However, social networking also poses significant challenges, including issues of privacy, confidentiality, and online safety.

This paper argues that social workers must develop the skills and knowledge to harness the potential of social networking for social change. By exploring the opportunities and challenges of social networking, social workers can better understand how to leverage these platforms to promote social justice, human rights, and community development. Ultimately, this paper aims to contribute to the development of a more effective and responsive social work practice in the digital age.

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Utilizing Bacteriophages as Biocontrol Agents in the management of Banana Xanthomonas Wilt. *Ritah Nakayinga1*, Isabirye Isaac1, Tracy Magoba1, Bayo Robert1 **Department of Biological Sciences, Faculty of Science, Kyambogo University, P.O. Box 1, Kyambogo, Kla (U) *Corresponding author: nakayingar@gmail.com**

Background: Banana Xanthomonas Wilt (BXW) is caused by Xanthomonas vasicola pv. musacearum (Xvm) and severely affects banana production in Uganda. BXW spreads via contaminated tools, plant material and vectors. Existing management practices are ineffective but bacteriophages offer a promising alternative/adjunct strategy for managing the disease.

Methods: Samples were collected from sewage, soil and banana pseudostems. Phage isolation and biological characterization was achieved using the spot assay and plaque assay techniques.

Results: Novel phages targeting Xvm were isolated from soil, pseudostems and sewage. They formed clear, circular plaques (1 - 3 mm) and killed 78 % – 100 % of Xvm strains. The phages are stable under diverse in vitro conditions such as temperature (25 °C - 120 °C), pH (1 - 13), and up to 8 hours in direct sunlight. Morphologically, they are siphovirus with an icosahedral head and a non-contractile tail. Their short life cycle includes a 10 min adsorption and latent period and a burst size of 15-35 particles per bacterium. Genome analyses confirmed the absence of antibiotic resistance genes and lysogeny-associated genes, supporting their safety for biocontrol applications. They effectively inhibited Xvm growth at MOIs of 0.1-10 in in vitro biocontrol experiments.

Conclusions: Bacteriophages targeting Xvm are naturally present in the environment, lytic, broad host range and stable across various in vitro conditions. As such, they are promising biocontrol agents for managing BXW.

Recommendation. Field trials are underway to evaluate their in vivo efficacy in field settings.

Keywords: Banana Xanthomonas Wilt, Xanthomonas vasicola pv. musacearum, Bacteriophages, Biocontrol

Design and Prototyping of a Dynamic and Cost-Effective Neonatal Incubator.

By; Roland Niwareeba

In this presentation, we focus on the design and prototyping of a dynamic and cost-effective neonatal incubator aimed at reducing neonatal mortality by providing reliable thermal support for premature and low-birth-weight babies. The dynamic incubator design has been modeled using SolidWorks CAD software.

It incorporates advanced thermal regulation with a precision Proportional-Integral-Derivative (PID) controller that achieves and maintains the critical 37°C neonatal temperature within just 8 minutes of activation, while ensuring uniform heat distribution with less than ±2°C variation throughout the incubation canopy. Furthermore, a piezoelectric atomizer and a humidity sensor have been incorporated to maintain the humidity level to within 40-60% which is suitable for the neonates.

The extensive computer simulations were validated through physical prototype testing, demonstrating consistent performance where the target temperature was reliably achieved in under 20 minutes during real-world operation. Our neonatal incubator addresses two major challenges which are common in developing countries: unreliable electrical infrastructure through an integrated energy-efficient backup power system, and emergency transport needs via a specially designed portable configuration that interfaces seamlessly with most ambulance vehicles available in developing countries.

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Strengthening the Links Between Industry and Academia for A Sustainable Textile Sector that Promotes Circular Economy in Sub Saharan Africa (METODIC).

By; Dr.Mugaanire Tendo Innocent

METODIC seeks to address the significant environmental and skills gaps in the textile industry across Uganda, Kenya, and Ethiopia. These countries have seen substantial growth in the textile sector, yet face major challenges such as waste generation, pollution, and a lack of skilled labor in sustainable practices. By equipping students with green competences and fostering stronger collaboration between academia and industry, METODIC aims to support the transition to a more sustainable and circular textile industry.

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Statistical Modelling of Factors Associated with Starvation in Karamoja Region

By; Smartson Ainomugisha

Starvation in Karamoja region remains a long- standing problem despite several interventions by government and development partners. This study employed logistic regression analysis to determine factors associated with starvation in Karamoja region, using primary data collected from three districts of Kaabong, Napak and Moroto. The results show that sex of the household head, marital status, separate income source, access to agricultural land, type of food, and age of the respondent are associated with starvation.
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Nature's weep

By; OBOTE LOUIS
With banana fibre as a medium, I confront the devastating efect of climate change caused by merciless human activities. Through sorrowful gaze with tears flowing down, I would like to show the pain being felt by entire wildlife.

The skeletal remains of the trees depicts the silent evidence of destruction caused by unthoughtful human activities. Yet amid the desolation, a white browed cocoul bird and the frog perches with their heads up demanding for Immediate intervention.
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Morphometric and Physicochemical Characterization of Mango Pulp and Byproducts from 22 Varieties in Uganda: Bioactive Profiling Across Ripening Stages

By; Henriettah Nakisozi

Mangoes (Mangifera indica L.) are a significant tropical fruit valued for their nutritional and bioactive properties. This study aimed to characterize the morphometric and physicochemical properties of mango pulp and byproducts (peel, seed, and kernel) and to quantify total phenolics, flavonoids, and carotenoids across five ripening stages in 22 mango varieties grown in Uganda.

Morphometric parameters assessed included fruit weight, fruit length, fruit width, peel weight, pulp weight, and stone weight. Physicochemical properties measured were pH, titratable acidity, total soluble solids, color, and moisture content, among others. Bioactive compounds were quantified using spectrophotometric methods across unripe, mature green, partially ripe, ripe, and overripe stages. Results indicated significant variation in bioactive content across ripening stages. Total phenolics were highest at the mature green stage; flavonoids peaked at the partially ripe stage, while carotenoids increased progressively, reaching maximum levels at the overripe stage. Indigenous mango varieties exhibited higher total phenolic and flavonoid content, whereas non-indigenous varieties showed elevated carotenoid levels. Physicochemical properties varied significantly among varieties, with non-indigenous varieties having higher total soluble solids and lower acidity. The findings highlight the influence of ripening on bioactive compound levels and the potential of mango byproducts for value-added applications. This study provides a foundation for optimizing bio active compound extraction and promoting sustainable utilization of mango byproducts in functional food and nutraceutical development.

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Poster: Design and Implementation of a Low-Cost LoRa-Based Sensor Node for Environmental Monitoring in Uganda.

By; ABEL KAMAGARA

Information about the environment plays a crucial role in effective planning and decision-making processes concerning environmental sustainability. Various environmental parameters such as ambient temperature and humidity, rainfall, wind speed and wind direction, radiation, etc., can be tracked to understand how the environment is changing, usually due to human activities. Over the years, efforts have been made to collect this information from many parts of Uganda. Despite these efforts, there is still a gap in the volume of data available to characterize the environment, most especially on a small scale. This is mainly caused by the high cost of current measurement devices which has greatly limited their use. In this study, we describe the development of a LoRa-based low-cost, low-power sensor node for measuring temperature, humidity, and particulate matter levels. What will be the significance of the findings?

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Spatial repellency of selected aromatic plant essential oils on Anopheles mosquitoes Malaria

By; Martha Kaddumukasa

Malaria is transmitted to humans through the bite of infected Anopheles mosquitoes. Traditional methods of controlling mosquitoes have involved the use of insecti cide-treated bed nets, sprays, and indoor residual spraying. Concerns about resistance to these chemicals makes the need for alternative solutions to be developed.

One of these solutions is the use of essential oils from plant extracts, either singly or in combination with other substances to repel mosquitoes. Essential oils from aromatic plants obtained from Nwoya, Uganda were extracted and processed.

A mosquito repellent was developed and spatial activity of these oils on Anopheles species were established after undergoing rigorous testing, Findings are discussed.

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Personalized medicine

By; OBOTE JOB

Personalized medicine represents a paradigm shift in healthcare, where treatments are tailored to an individual's unique genetic, environmental, and lifestyle factors. This presentation showcases innovative approaches to personalized medicine, leveraging cutting-edge technologies and data analytics to revolutionize disease diagnosis and treatment. Our project focuses on the development of a precision medicine platform that integrates genomics, epigenomics, and artificial intelligence to predict patient responses to different therapies. We will present a case study on the application of this platform in oncology, demonstrating how personalized treatment plans can improve patient outcomes and reduce healthcare costs. Through this presentation, we aim to highlight the transformative potential of personalized medicine and inspire further innovation in this field. Our project demonstrates that by harnessing the power of data and technology, we can create a more precise, effective, and patient-centered healthcare system.

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Transforming Teacher Education in Uganda: The Role of Digital and Blended Learning in Enhancing English Language Instruction in Primary Teacher Colleges

By; ONGOM EMMANUEL

I am a dedicated educator with extensive experience in English language instruction. I serve as a part-time lecturer in English Language Education at Kyambogo University, Soroti Learning Center, and a substantive graduate tutor at Arua Core Primary Teachers' College. With over 17 years of teaching English in primary schools across Uganda, I have played a pivotal role in shaping language education. I hold a Master of Arts in Literature and English Linguistics from Gulu University.

My expertise spans teacher training, curriculum development, and pedagogical research, making me a key contributor to English language education in Uganda. Abstract Teacher education in Uganda faces persistent challenges in English language instruction, necessitating innovative pedagogical approaches. Digital and blended learning have emerged as transformative tools for improving teaching methodologies and learning outcomes (Mugimu et al, 2021). This study explores the integration of digital and blended learning in primary teacher colleges, assessing their impact on pre-service teachers' English proficiency and instructional effectiveness. The study adopts a mixed-methods approach, combining surveys, interviews, and classroom observations in selected Ugandan primary teacher colleges. It examines how digital resources, interactive learning platforms, and blended pedagogies enhance teacher trainees' English competencies and teaching strategies (Kintu, et al, 2017). The research also evaluates infrastructural readiness and institutional support for technology-driven learning. Findings will highlight the effectiveness of blended learning in addressing English language gaps among teacher trainees. The study will explore best practices in integrating digital tools, such as virtual simulations and mobile learning, to improve engagement and comprehension (Omodan, 2020). Additionally, it will identify challenges such as internet access, digital literacy, and policy constraints affecting implementation. This research contributes to teacher education reforms in Uganda by providing evidence-based recommendations for integrating digital and blended learning. The findings will inform policymakers, educators, and donors on strategies for enhancing teacher training and English instruction through technology (UNESCO, 2022). Addressing these challenges can significantly improve language education and overall teaching quality in primary schools.

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DEVELOPMENT OF A PROTEIN ENRICHED MILLET-BASED COMPOSITE FLOUR USING SPIRULINA POWDER (Arthrospira platensis) FOR CHILDREN OF 6 TO 59 MONTHS

By; SCOVIA LAKER

This study focused on developing a protein-enriched millet-based composite flour incorporating spirulina powder (Arthrospira platensis) to improve the nutritional profile of complementary weaning foods for children aged 6 to 59 months. Millet, commonly used as a complementary food for children under five, is often deficient in meeting recommended daily allowances and is compromised by anti-nutritional factors. To address these limitations, we compared germinated and non-germinated millet flours by analyzing their proximate composition, mineral content, anti-nutritional factors, and beta carotene levels using AOAC methods, atomic absorption spectrophotometry, and UV-Visible spectrophotometry. Our findings revealed significant differences ($p<0.05$) between the two treatments. Germination increased protein, fat, and mineral contents, while markedly reducing anti-nutritional factors such as oxalates, phytates, and tannins. Incorporating spirulina (at 0 to 10% substitution) further enhanced the nutritional quality of the germinated millet flour. Consumer evaluation indicated that porridge prepared from the composite flour, particularly with a 2% spirulina inclusion, was the most preferred product. These results suggest that combining germination with spirulina enrichment offers a promising strategy to improve the nutrient density of millet-based complementary foods. Additional research is needed to evaluate the bioavailability of iron and protein in the composite flour and to optimize formulation parameters. This work contributes to the development of affordable, nutrient-rich weaning foods that could play a vital role in combating malnutrition and promoting healthy growth in young children. Future studies should investigate long-term health impacts and sensory acceptance to further validate the potential of this novel formulation for widespread nutritiona interventions in children.

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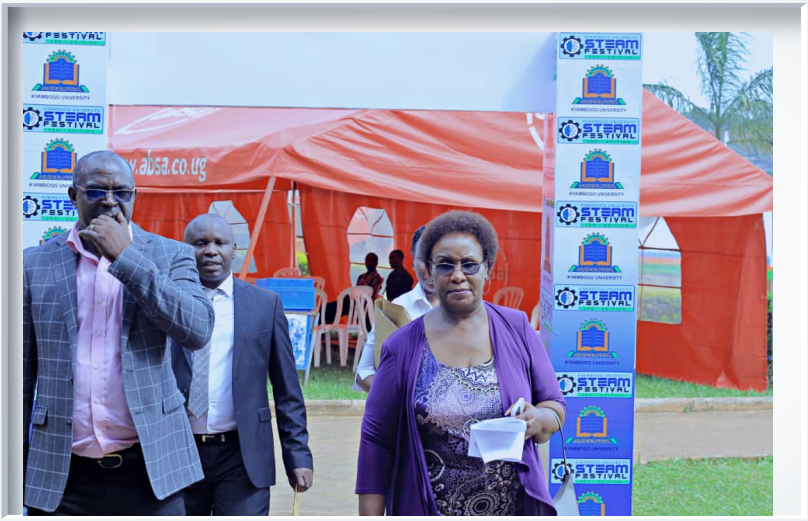
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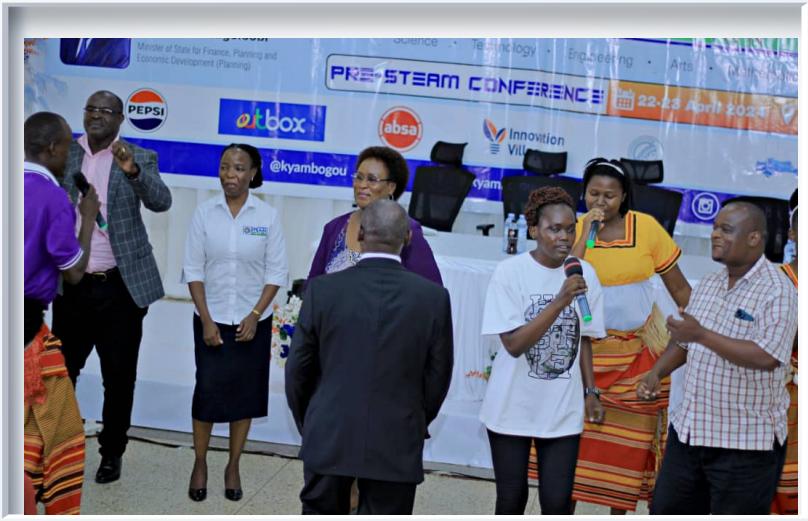
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3RD STEAM

- Some of the success stories of Projects exhibited at previous STEAM Editions and are now being supported for development:

1. Production of a DC-powered Baby Incubator by Dr. Favour Excellence and Team: this is under development at UIRI.
2. Mr. Martin Kafeero/ the Mad Scientist (our long-term STEAM collaborator): is currently establishing a Science Center at Namanve Industrial Park.
3. Extraction of high value minerals from plastic waste by Mr. Kato Peterson: is in touch with a team from Morocco discussing opportunities for further development.
4. Operating a computer without touching it by Dr. Fredrick Kanobe and Team: have published an article in a high impact factor Journal and are seeking a partner to promote the project.
5. Solid waste management/ Incinerator by Department of Civil under the Faculty of Engineering: Is under development for application in local communities.
6. Production of fuel from plastic waste by Mr. Waiswa Tifu from the Department of Physics: is under use on a farm owned by the project innovator.

- Other Unique innovations that need handholding for further development:

1. Using Internet of Things to control security lights at home.
2. Creation of the Giant Elephant from automobile waste.
3. Production of chicken drinkers and feeders using plastic waste.
4. Production of pasteurized organic manure to enhance clean food production.
5. Development of a solar powered mower.
6. Production of an Aerial Drone

- PARTICIPANTS AND SPONSORS

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4. Kampala Diplomatic School.
5. Nabisunsa Girls School.
6. Namilyango College.
7. Seeta High School.

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