



MACHAKOS UNIVERSITY

Co-Creating Sustainable Futures

BIANNUAL RESEARCH AND INNOVATION BULLETIN



FUNDAMENTAL STATEMENTS

Vision

Excellence in transformative scholarship and community service.

Mission

To Provide scholarship through Teaching, Training, Research and Innovation; and community service for sustainable industrial and socioeconomic transformation.

Identity Statement

Machakos University is an Academic Institution Committed to Generating and Transmitting Knowledge, Skills and Attitude through Science, Technology, Research and Innovation for the Benefit of Humanity.

Philosophy Statement

The Philosophy of Machakos University is to provide transformative leadership in Teaching, Training, Research, Innovation, Industrial and Technology transfer for wealth creation.

Core Values

Creativity

Agility

Meritocracy

Professionalism

Integrity

Inclusivity

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EDITORIAL MESSAGE



We are excited to present the tenth edition of the Machakos University Biannual Research and Innovation Bulletin. This issue, carefully curated by the Editorial Board, features a diverse selection of articles designed to engage and inform our readers. The Division of Research, Innovation, and Linkages remains committed to promoting excellence in education through rigorous training, groundbreaking research, and innovative approaches that contribute to industrial advancement and socio-economic development. We extend our heartfelt gratitude to the University

Management, the Machakos University community, and our valued partners for their unwavering support in championing research, innovation, and technology transfer. This edition showcases our ongoing efforts to expand knowledge in technological innovation and refine these practices through the activities highlighted within. We trust you will find it an inspiring and insightful read!

*Prof. David Mulwa, Ph.D,
Ag. Registrar (Research Innovation and Linkages) &
Chairman, Editorial Board*

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FROM THE DEPUTY VICE-CHANCELLOR (RESEARCH, INNOVATION AND LINKAGES)



Machakos University proudly stands at the forefront of innovation, research, and academic excellence, serving as a vibrant hub where groundbreaking ideas and solutions to global challenges are conceived and nurtured. Guided by a vision for a sustainable future, we channel our efforts into transformative technological innovations that address today's pressing needs while paving the way for tomorrow's opportunities. Anchored in Kenya Vision 2030 and the Bottom-up Economic Transformation Agenda (BETA), our mission aligns seamlessly with the University's strategic plan to empower communities and industries through science, technology, and education.

At the heart of our efforts lies a commitment to advancing Science, Technology, Engineering, and Mathematics (STEM) through comprehensive training programs and state-of-the-art research infrastructure. But our impact extends far beyond the classroom. We are redefining community development through collaborative ventures that test, refine, and commercialize innovative ideas, ensuring real-world solutions that drive economic growth and social transformation.

In this bulletin, you will discover an array of inspiring projects that highlight our unwavering dedication to shaping a sustainable future. From public lectures that unlock the potential of carbon credits to initiatives preserving African cultural heritage, and ICT-driven programs fostering technological excellence, we are making strides that resonate globally.

This edition is not just a showcase of achievements; it is a testament to our belief in the power of knowledge, creativity, and collaboration to build a better world. We invite you to dive in and explore the dynamic energy and innovative spirit that make Machakos University a beacon of progress and possibility. Let's shape the future, together.

*Prof. Stanley M. Makindi, PhD,
Ag. Deputy Vice Chancellor,
Research, Innovation and Linkages*

LUBAN WORKSHOP EVALUATION

The Machakos Luban Workshop was set up on 14th, December 2019, through a partnership with Tianjin City Vocational College (TCVC) and Huawei Technologies. It has helped improve ICT and engineering education at Machakos University. The workshop provides training in cloud computing, artificial intelligence, and project-based learning. It also supports Kenya's Competence-Based Curriculum (CBC) through the Engineering Practice, Innovation, and Projects (EPIP) Centre, which combines hands-on learning with solving real-life problems to help students gain important technical and creative skills.

On 5th December, 2024, an evaluation was done to check the workshop's impact, how well it runs, and how it fits with the University's goals. The review looked at program results, use of resources, stakeholder contributions, and sustainability. It found that the workshop has successfully improved technical skills, encouraged innovation and linked education to industry needs. It also noted some challenges, like limited resources and the need for stronger partnerships. The evaluation very successful.

Recommendations were made to address these issues, support the workshop's growth, and increase its role in education and community development. These findings will help in future planning and ensure the Luban Workshop continues to be a leader in ICT and engineering education.

During the evaluation:

- a) The University received a donation of professional equipment such as laptops and 3D printers.
- b) Kenya EPIP Teaching Research and Application Promotion Demonstration Center was unveiled.
- c) Digital Talent Training Center was unveiled.
- d) Machakos University and Tianjin City Vocational College (TCVC) signed a new Cooperation Agreement.

During the event, keynote addresses were delivered by Prof. Joyce Agalo, Vice Chancellor of Machakos University, Dr. Christopher Gatama Gakahu, Council Chair of Machakos University, Prof. Yang Yan from Tianjin Academy of Educational Sciences and Tianjin Luban Workshop Research and Promotion Center, Duan Yarui from the Hebei District, Educational Bureau of Tianjin, Prof. Li Yan, Board Chairman of Tianjin City Vocational College and Dr. Joyce Wanjiru Ngunjiri who represented the Cabinet Secretary, State Department of Higher Education and Research, Ministry of Education.



The event, hosted at Machakos University Hotel and Conference Center, brought together senior government officials from Kenya and Tianjin Municipality in China, alongside academic and industry leaders. Keynote addresses were delivered by Prof. Joyce Agalo, Vice Chancellor of Machakos University; Dr. Christopher Gatama Gakahu, Council Chair of Machakos University; Prof. Yang Yan from Tianjin Academy of Educational Sciences and Tianjin Luban Workshop Research and Promotion Center; and Dr. Joyce Wanjiru Ngunjiri, reading the Speech for The Cabinet Secretary, State Department of Higher Education and Research, Ministry of Education, Kenya.

Prof. Joyce Agalo emphasized that the partnership would expand the enrollment scale of Luban Workshops, boosting digital and technical skills development within the East African community.

Dr. Christopher Gatama Gakahu, Chair of the Council at Machakos University, highlighted

the transformative impact of the collaboration, noting that it bridges the gap between theoretical knowledge and practical application. He remarked that the initiative equips students to excel in an increasingly globalized and technologically advanced world, positioning it as more than just an educational program but a vital contributor to the national development agenda.

Prof. Li Yan, Board Chairman of Tianjin City Vocational College, highlighted the significance of the Luban Workshop as a platform for international collaboration. She noted that the workshop will serve as a hub for higher vocational and technical education, aligned with China's Belt and Road Initiative.

Dr. Joyce Ngunjiri, Assistant Director of Research in Kenya's Ministry of Education, reiterated that the agreement underscored a shared commitment to capacity building and excellence in technical and vocational education.



Impact and Contributions of the Luban Workshop

The Luban Workshop at Machakos University, the second of its kind in Africa, was launched on December 14th, 2019, aiming to provide vocational skills training to African youth under the Belt and Road Initiative. With support from China's Ministry of Education, the Tianjin Municipal Education Commission, and the Hebei District Government, the workshop integrates industry and education to produce skilled personnel for global, technology-driven industries.

Key projects supported by the workshop include cloud data centers, cloud computing and IoT systems, urban communication and fiber-optic networks, urban safety monitoring systems, and intelligent transportation systems.

During the evaluation, critical aspects such as construction positioning, development strategies, operational management, teaching resources, and sustainability were assessed. Notable contributions included the donation of advanced equipment like laptops and 3D printers to Machakos University.

The conference concluded with remarks by Duan Yarui from the Hebei District Educational Bureau of Tianjin and Dr. Christopher Gakahu, Chairman of the Council of Machakos University. This enhanced collaboration promises to strengthen ties between Kenya and China, leveraging the Luban Workshop as a vital platform for advancing technical education and fostering innovation in Africa.



MKSU AND LONGHORN PUBLISHERS PROPOSE DIGITAL CONTENT COLLABORATION

The Management of Machakos University led by the Vice Chancellor Prof. Joyce Agalo and Deans of Schools held a consultative meeting on 18th November 2024 with the Chief Executive Officer from LongHorn Publisher Mr. Maxwell Wahome and LoHo Learning Chief Executive Officer Mr. James Ong'ang'a to explore collaboration avenues in creating digital learning content for tertiary education. The meeting focused on leveraging LoHo Learning Platform and enhancing the University's Open, Distance, and E-Learning (ODEL) programmes, while aligning the institution's academic offerings with the Competency-Based Curriculum (CBC).

Acknowledging the necessity of digital transformation, the partnership will aim to develop practical and applicable content for the LoHo Learning Platform through a Memorandum of Understanding (MOU). Deans and lecturers from Machakos University will

actively participate in this initiative by ensuring that students benefit from quality digital resources and practical sessions designed to meet modern educational demands.

During the meeting, the Vice-Chancellor Prof. Joyce Agalo emphasized the importance of introducing short courses that will equip graduates with skills relevant to emerging job markets, including opportunities outside Kenya. This aligns with the government's efforts to establish bilateral labor agreements globally. Deans from respective school will develop proposals for the courses for implementation as part of the University's strategy to enhance graduate employability.

This collaboration represents a significant step toward co-creating sustainable futures by integrating technology into education and preparing graduates for a dynamic global workforce.



Seated from left to right) Prof. Richard Kimiti, Mr. Maxwell Wahome, the Vice Chancellor Prof. Joyce Agalo, Mr. James Ong'ang'a and Prof. Mugendi M'Rithaa.





MACHAKOS UNIVERSITY ADVANCES ENVIRONMENTAL CONSERVATION THROUGH TREE GROWING INITIATIVE AT KONZA TECHNOPOLIS DEVELOPMENT AUTHORITY

Machakos University took undertook an environmental conservation and sustainability by spearheading a significant tree-growing initiative at Konza Technopolis Development on Friday, 15th November 2024. The event, conducted in collaboration with Konza Technopolis Development (KoTDA), the Kenya Forest Service (KFS) led by the Ecosystem Conservator, and Machakos County Government, emphasized the University's commitment to fostering sustainable practices and strengthening inter-institutional partnerships.

The event marked the first tree-growing exercise undertaken by Machakos University at Konza Technopolis Development Authority. The project aimed to promote environmental conservation while leveraging the existing collaboration between the two institutions. The activity, hosted at the designated 'Nurture Park' area, was led by Mr. John Okwiri, OGW, the Chief Executive Officer of Konza Technopolis, alongside Prof. Peter Koech, representing the

Vice-Chancellor of Machakos University Prof. Joyce Agalo.

The target of planting over 10,000 trees was successfully achieved, symbolizing a shared commitment to a sustainable future. The initiative aligns with the national agenda to plant 15 billion trees by 2032, further demonstrating the University's role in supporting government efforts in advancing ecological sustainability.

The tree-growing exercise commenced with Mr. John Okwiri, OGW, CEO of Konza Technopolis, extended a heartfelt appreciation to Machakos University for choosing Konza Technopolis as the site for this impactful exercise. Mr. John noted that the 'Nurture Park,' designated for tree planting exercise, embodies Konza's vision as a smart city committed to sustainable development. He assured the University of exemplary care for the planted trees and expressed enthusiasm for continued collaboration between the two institutions.

Following was remarks by Ms. Milkah Mutua, the Ecosystem Conservator emphasizing the critical importance of tree planting for cleaner environments and sustainability. She reiterated the government's vision for massive tree planting to combat climate change and restore Kenya's natural ecosystems.

Prof. Peter Koech, representing the Vice-Chancellor, highlighted that this initiative exemplified the spirit of collaboration between Machakos University and Konza Technopolis Development Authority (KoTDA). Prof. Koech underscored the alignment of the tree planting exercise with the Government's agenda and its reflection of the University's collective duty to restore and preserve the environment. Prof. Koech also noted that balancing technological innovation with ecological responsibility is key to nurturing both knowledge and natural heritage. Prof. Koech expressed deep gratitude to all participants and reaffirmed the University's commitment to future tree-growing initiatives.

The tree growing at Konza Technopolis has reinforced Machakos University dedication to environmental stewardship while strengthening partnerships that align with both national and global sustainability goals.



Prof. Peter Koech, representing Machakos University Vice Chancellor Prof. Joyce Agalo, delivering a speech.



Mr. John Okwiri, OGW, CEO of Konza Technopolis delivering remarks



Ms. Milkah Mutua, the Ecosystem Conservator, delivering brief remarks



OFFICIAL LAUNCH OF THE CLIMATE AND AIR MONITORING EQUIPMENT AT MACHAKOS UNIVERSITY

Machakos University proudly launched a cutting-edge Climate and Air Monitoring Equipment, marking a significant milestone in the University's commitment to advancing research in environmental sciences on 24th October 2024. The project is a result of a fruitful collaboration facilitated by the University's Division of Research, Innovation, and Linkages through the Dean School of Engineering and Technology Dean School of Agriculture, Environment and Health Sciences.

The event was graced by members of the University Council, led by the Chairman, Dr. Christopher Gatama Gakahu, and the University Management, headed by the Vice Chancellor, Prof. Joyce Agalo. Also in attendance were, Senate members and undergraduate students pursuing Bachelor of Environmental

Science, Bachelor of Environmental Studies and Community Development, Bachelor of Environmental Studies (Environmental Resource Conservation) and Bachelor of Science in Public Health.

The guest of honour, Dr. Richard Damoah, Assistant Professor in the Climate Science Division at Morgan State University (MSU), delivered an insightful remarks on the importance of climate research and air quality monitoring system. Dr. Damoah has more than 15 years of experience in chemistry climate modeling, radiative transfer modeling, trajectory modeling, pollution measurement and data analysis with strong programming skills. His activities over the years have included using climate model to investigate the interaction between air pollution and climate.



Dr. Richard Damoah addressing members during the launch

The instruments are equipped with advanced features designed to monitor a wide range of air pollutants, enabling comprehensive evaluation of atmospheric conditions in comparison to clean air standards and historical data. Additionally, they measure climate variables and other environmental parameters contributing to sustainable development and environmental conservation efforts in the region.

The Vice Chancellor, Prof. Joyce Agalo highlighted the potential impact of the project on both the University and the surrounding community stating that the project will not only serve the Machakos community through its research and recommendations, but it will also open up new avenues for further research in environmental science and the health sector. The Vice Chancellor reiterated the University's efforts to promoting impactful research that addresses both local and global environmental challenges.



The climate and air monitoring equipment

The Chairman of the University Council, Dr. Christopher Gakahu, echoed the Vice Chancellor's sentiments by emphasizing the importance of collaboration in driving research efforts. Dr. Gakahu noted that the collaboration has created opportunities for both local and international partnerships, including student and staff exchange programme that would further enhance the research capacity of Machakos University.

The official launch was marked by a ribbon-cutting ceremony, officiated by the Chairman of the University Council, Dr. Christopher Gatama Gakahu, the Vice Chancellor Prof. Joyce Agalo, and the Guest of Honour, Dr. Richard Damoah.

The launch of this equipment sets the stage for Machakos University to become a hub for environmental research, further positioning it as a leader in climate and air quality studies in the region. The university looks forward to collaborating with various stakeholders, both locally and globally, to harness the power of data for positive environmental change.



Ribbon-cutting ceremony and official launch of the new equipment

MACHAKOS UNIVERSITY HOSTS THE EIGHTH PUBLIC LECTURE ON MENTAL HEALTH ISSUES, CONSEQUENCES, AND INTERVENTIONS

Machakos University welcomed students, members of staff, and distinguished guests to its 8th Public Lecture. centered on the critical topic of “Mental Health Issues, Consequences, and Interventions.” on October 16th, 2024. This significant event, held at the University Amphitheatre, featured mental health advocate Ms. Grace Joseph as the Chief Guest, offering attendees valuable insights into the complexities of mental health and strategies for meaningful intervention. Ms. Grace Joseph serves as the Director of Counselling Services at the State Department for Public Services.

The Eighth Public Lecture was officially opened by Machakos University Vice Chancellor, Prof. Joyce Agalo, who warmly welcomed participants and expressed appreciation to the distinguished guests for the participation. In her opening remarks, Prof. Agalo emphasized the critical need to address mental health challenges within academic settings and beyond, highlighting the value of increased awareness and proactive intervention.



The Vice Chancellor Prof. Joyce Agalo delivering welcoming remarks and officially opening the 8th Public Lecture.

The Vice Chancellor commended the Division of Research, Innovation, and Linkages, particularly the Directorate of Research, Innovation, and Technology Transfer, for the ongoing efforts to promote dialogue on mental health awareness and intervention. She further applauded all attendees for the engagement on the important event, affirming the University's commitment to fostering a supportive environment that prioritizes holistic well-being.

The first speaker of the day, Ms. Grace Joseph, delivered a compelling presentation on "Mental Health Issues, Consequences, and Interventions." She examined the societal implications of mental health challenges and outlined pathways for meaningful intervention, encouraging the audience to consider both individual and collective roles in mental health advocacy.

Following the keynote address, a plenary session brought together an esteemed panel, including Prof. James Muola, the Deputy Vice Chancellor for Academic and a Professor of Educational Psychology, and Student Affairs at Machakos University, and Dr. Jennifer Njoki a Consultant Psychiatrist at Machakos Level 5 Hospital. Their expert insights enriched the dialogue, contributing to an engaging and thought-provoking discussion. Machakos University remains steadfast in its commitment to promoting mental wellness and ensuring an environment that supports mental health and well-being for all students and staff for the benefit of the broader community.



The Chief Guest Ms. Grace Joseph presents on 'Mental Health Issues, Consequences, and Interventions'.



Plenary Session Panelists: (Left to right) Dr. Jennifer Njoki, Ms. Grace Joseph and Prof. James Muola

MACHAKOS UNIVERSITY PARTICIPATES AT THE 41ST INTERNATIONAL ASSOCIATION OF SCIENCE PARKS (IASP) CONFERENCE



Machakos University was honored to participate in the prestigious 41st International Association of Science Parks (IASP) Conference, held from 23rd to 27th September 2024. The event, hosted by Technopolis Development Authority (KoTDA) under the Ministry of Information Communications and Digital Economy, aimed to position Konza as an emerging Smart City and Science Park while offering a platform for global science park representatives to exhibit innovations from their respective countries.

The theme for the conference was “Demographics, Entrepreneurship, and Technology: Defining the Frontiers of Future Economies, which had significance in exploring the role played by Science Parks and areas of innovation in empowering regions such as Africa and Asia to harness the great potential of their growing youth demographic, entrepreneurship, and technology for economic growth. The theme would also help in addressing the challenges posed by a global population that is steadily aging.

The Conference was officially inaugurated by the Deputy President of the Republic of Kenya, H.E. Rigathi Gachagua, whose presence signified Kenya’s growing reputation as a hub for technological innovation.

As an official partner of Konza Technopolis, Machakos University’s involvement in the conference was integral. Several international delegates and participants from the IASP conference on Monday, 23rd September, toured the University’s Luban Workshop where they were introduced to the lab’s cutting-edge infrastructure and various student-led innovations by one of the Instructors in the Luban Workshop.



On Tuesday 24th September 2024, Machakos University students from the School of Engineering and Technology and the School of Pure and Applied Sciences, presented two innovative projects namely; ***“The Blind Eye Application”*** and ***“Robox Farm Innovation”***, at Konza Technopolis. Accompanying them were Prof. David Mulwa, The Registrar of Research, Innovations and Linkages and Dr. Erick Omuya, Chair of the Department of Computing and Information Technology and also the instructor of the two projects. The talented and ambitious students showcased prowess in Artificial Intelligence (AI) in developing Application and innovations that would empower the visually impaired persons in accessibility and independence, and also assist farmers in monitoring farm data i.e. temperature, humidity, soil moisture, and NPK levels to improve productivity respectively.



MKsU student demonstrating the Blind Eye Innovation



MKsU student demonstrating the Robox Farm Innovation

From Wednesday 25th to Friday 27th September, 2024 the Conference was held at the Kenyatta International Convention Centre (KICC) where more innovations were displayed.

A major highlight of Machakos University’s participation occurred on 27th September when the Vice Chancellor, Prof. Joyce Agalo, attended the Conference as a panelist during the Vice Chancellors’ Roundtable. In this session, she presented on the pivotal role universities play in supporting science parks and fostering emerging technologies. Prof. Agalo highlighted Machakos University’s contributions to innovation through its facilities such as the Luban Workshop, Stem power Center, Jitume Lab, Ajiry Center among other advanced technology labs within the institution.



Panelists, among them is Machakos University Vice Chancellor, Prof. Agalo during the Vice-Chancellors Roundtable Session



Machakos University Vice Chancellor, Prof. Joyce Agalo making a presentation at the Conference (KICC)

Machakos University's presence at the IASP Conference not only strengthened its partnership with Konza Technopolis but also demonstrated the University's commitment to advancing innovation and research on a global scale. The conference provided invaluable exposure for students and staff, reinforcing the University's position as a key player in technological advancement and education in Kenya.

ACADEMIC WRITING AND MENTORSHIP WORKSHOP

From October 2nd to 4th 2024, students pursuing PhD in African Literature and a Master of Arts in Literature at Machakos University participated in a three-day Academic Writing and Mentorship Workshop. Held in the DVC (ASA) Boardroom, the workshop focused on enhancing students' writing, peer-review, and editing skills for publishing in prestigious journals.

Convened by Dr. Charles Kebaya, the workshop is part of the ongoing African Literature Metadata (ALMEDA) research project, funded by the European Union and based at Uppsala University, Sweden. Prof. Nicklaus Hallen, a key member of the ALMEDA team, served as the principal facilitator, providing invaluable

insights and guidance throughout the sessions.

Dr. Kebaya, who coordinates ALMEDA activities at Machakos University, emphasized the importance of research, academic writing training, and mentorship workshops in fostering scholarly development. As a result of their participation in the workshop, students have been included as co-authors in a collaborative book project, which is a significant deliverable of the ALMEDA initiative.

This workshop represents a crucial step in supporting the next generation of scholars in African literature, equipping them with the skills necessary for successful academic publishing.



Dr. Dr. Kebaya giving a Presentation

INTELLECTUAL PROPERTY RIGHTS (IPR) TRAINING TO EMPOWER STAFF AND STUDENTS

Machakos University recently held a comprehensive Intellectual Property Rights (IPR) training aimed at equipping academic staff and students with the vital knowledge on the protection and patenting of innovations, inventions and creative works. The training was facilitated by Prof. Jones Agwata, The Director of Research, Innovation and Technology Transfer, who brought a wealth of experience and expertise in intellectual property management.

The IPR training is part of the university's continuous efforts to foster a culture of innovation and research among its academic community. With the rise of technological advancements and creativity, safeguarding intellectual property has become increasingly essential. The training covered key areas including patenting processes, copyrights, trademarks, industrial designs and the importance of protecting academic and research output.



In his remarks, Prof. Agwata emphasized the critical role of IPR in enhancing the university's contribution to national and global development. He noted that understanding intellectual property rights is fundamental for students and researchers as they embark on innovation-driven projects. "We are committed to ensuring that our staff and students are well-prepared to navigate the complexities of intellectual property, from innovation to commercialization," he added.

Participants were guided through the steps of filing patents and protecting their works, while learning about the legal frameworks governing intellectual property both locally and internationally. This practical knowledge is expected to empower students and researchers to maximize the potential of their innovations while ensuring their rights are protected.

The training also highlighted the growing involvement of Machakos University students and staff in various innovation initiatives and research projects. The university is actively encouraging more students to participate in research that addresses local and global challenges, with the potential for commercialization and real-world impact.

This training is part of a broader institutional effort to foster a robust research and innovation culture at Machakos University. As more students and staff engage in cutting-edge research, the knowledge gained from this training will prove indispensable in ensuring their work is protected and that they benefit from their innovations.

STUDENT/STAFF EXCHANGE PROGRAMMES

Return of the First Cohort of 5 Students From Riga Technical University, Latvia

The first cohort of five students who participated in the Inter-Institutional Agreement between Riga Technical University (RTU), Latvia, and Machakos University successfully completed their exchange program in July 2024. From September 2023 to June 2024, the students fully immersed themselves in their respective courses at RTU. The students in this cohort are Lemiso Godwin, Shallon Maria, Lisa Atieno, Kelvin Njoroge, and Brayan James Mburu.

The students successfully completed the exchange programme, attending classes from September 24th, 2023 to June 22nd, 2024. In addition to gaining academic knowledge, they developed a strong appreciation for the Latvian language, which will undoubtedly serve as a valuable asset in their future careers.

Beyond academics, the students formed lasting friendships with peers from around the world, expanding their global network, a benefit that will enhance both their professional and personal lives.



From left: Ilemiso, Lisa, Prof. Makindi, Kelvin, Bryan and Shallon.



The students with their friends at RTU during the Riga Mathon, Latvia on 1st October, 2023



The students having fun in Cairo, Egypt during Visa application to Latvia

The 2nd Cohort of 2 Students Arrived in Rtu on 13th September, 2024.

The second cohort of students travelled to Riga Technical University, Latvia on 13th September, 2024. The two students, Wegdeger Sindani Mugatsia from the School of Agriculture, Environment and Health Science and Ariel Matara from the School of Engineering and Technology will be in Latvia from September, 2024 to January, 2025.



Wegdeger and Ariel at Jomo Kenyatta International Airport, en route to Riga Technical University (RTU).



Wegdeger and Ariel at the Kenyan Embassy in Cairo, Egypt with the Kenyan Ambassador and their host during visa application to Latvia.

Two Staff Travelled to Riga Technical University

Daniel Mulinge the head of ICT, participated in the International Mobility Teaching Week at Riga Technical University, Latvia, from October 14 to 18, 2024. The primary objective of this exchange program was to engage with RTU on best practices in ICT infrastructure and digital transformation in higher education, as well as to identify potential areas for collaboration. Additionally, Prof. Stanley Makindi visited Riga Technical University, Latvia, from November 11 to 15, 2024, to participate in the evaluation of Erasmus+ projects with higher education institution partners.



Prof. Makindi and Daniel Mulinge with students at Riga Technical University, Latvia

Three (3) Attended the International Staff Week at University of Piraeus, Greece From 23rd ~27th September, 2024.

The following three staff members are scheduled to attend the International Staff Week at the University of Piraeus, Greece from 23rd to 27th September 2024:

1. Dr. Alice Nzioka – School of Business, Economics, Hospitality and Tourism Management.
2. Dr. Monica Masake – School of Agriculture, Environment and Health Sciences
3. Prof. Stanley Makindi, Ag. DVC (RIL) – School of Agriculture, Environment and Health Sciences.

They were in Greece for one week, engaging in academic exchanges and fostering international collaboration.

Tubaf Erasmus+ Ph.d Traineeship Programme ~freiberg University

Machakos University is one of the cooperating partner in the TUBAF Erasmus+ project under Dr. Veronica Okello and Dr. Elizabeth Ndunda.

One PhD student from Machakos University went the Technical University of Mining and Technology (TU BAF) in Freiberg, Germany. Additionally, a staff member from TU BAF visited Machakos University for a one-week teaching mobility in September 2024.

MACHAKOS UNIVERSITY'S RESEARCH SHINES AT THE KENYA NATIONAL RESEARCH FESTIVAL 2024

Machakos University has once again demonstrated its research prowess by securing a National Outstanding Researcher Award (NORA) during the Inaugural Kenya National Research Festival 2024 which was held on 19th – 23rd August 2024 at the Edge Convention Centre, Nairobi. The festival was jointly organized by National Research Fund (NRF), and Young Scientists Kenya (YSK), a non-profit organization that inspires and empowers the next generation of young scientists, innovators and entrepreneurs to transform their communities through Science, Technology, Engineering and Mathematics (STEM).

The festival marked the beginning of celebrating milestones achieved by Kenyan researchers. It will be held on an annual basis to recognize their impactful contributions in multidisciplinary research. The awarding ceremony was graced by distinguished guests including Mr. Fredrick Ndambuki, who represented Dr. Beatrice Muganda Inyangala, the PS, State Department of Higher Education and Research, Prof. Ratemo Michieka, Chairperson NRF, Prof. Dickson Andala, the Chief Executive Officer, NRF.

The event commenced with a keynote session on Innovative sustainable research funding in the global south which discussed the development and implementation of new and creative ways to secure ongoing financial support for research activities in regions typically considered part of the global South, such as Africa, Latin America, and parts of Asia. The session, whose panelist consisted of Prof. Mike Kuria, CEO, Commission for University Education (CUE), Prof. Catherine Ngila, CEO, African Foundation for Women & Youth in Education and STI (AFoWYEST) and Dr. Vincent Okungu, a Senior Researcher from the University of Nairobi, highlighted that the funding will address unique challenges and opportunities in these regions, thereby promoting research that can lead to social, economic, and technological advancements while ensuring that the resources needed for such research are maintained over time.

Dr. Veronica Okello, a researcher from Machakos University received a Special Recognition Award under Women Researchers in the category of Physical Sciences, Technology and Innovation. The Award is given to Kenyan female researchers with 5 years and above research experience. Prof. Stanley Makindi, Acting Deputy Vice Chancellor, Research Innovation and Linkages, received this outstanding award in her absentia.



Dr. Veronica Okello

MACHAKOS UNIVERSITY AND TIANJIN CITY VOCATIONAL COLLEGE STUDENTS GEAR UP FOR CLOUD COMPUTING TALENT EXCHANGE TRAINING PROGRAM

Four students from Machakos University (MksU), alongside one instructor and Tianjin City Vocational College (TCVC) students, are participating in a professional talent training program on Cloud Computing initiated in May 2024.

The training program is designed to equip students with knowledge and hands-on experience in cloud technologies allowing the students to dive deep into various aspects of cloud computing, including infrastructure, platforms and software services. The curriculum is structured to provide a comprehensive understanding of cloud architecture, deployment models and security practices, ensuring that participants are well-prepared for future industry opportunities and challenges.

A highlight of this initiative is the culminating competition scheduled for October 2024 in Tianjin City, China. This event will bring together the brightest minds from MksU alongside others students from other universities, offering them a platform to showcase skills, innovation and problem-solving abilities. The competition aims to foster a spirit of collaboration and a healthy competition among participants, while also providing them with opportunity to network with global industry leaders and experts.

Machakos University is proud of its students for embarking on this transformative journey and representing the institution on an international stage. This program not only enhances their technical prowess but also broadens their cultural horizons, preparing them to excel in a globalized workforce.



TSINGHUA UNIVERSITY STUDENTS PAY A COURTESY CALL TO THE VICE CHANCELLOR

On Wednesday, August 6th, 2024, two research students from Tsinghua University, Beijing, China, led by Prof. Aobo Ran, a Research Assistant Professor at the Think Tank Center, Tsinghua University, Beijing, paid a courtesy call to the Vice Chancellor of Machakos University.

The visit aimed to discuss and conduct research on the Luban Workshop and its effectiveness. The meeting was facilitated by the Research Division, led by the acting Deputy Vice Chancellor in charge of Research, Innovation, and Linkages, Prof. Stanley Makindi.



The visitors learned that students have been actively engaging in projects involving Internet of Things (IoT) for waste and water management, smart agriculture utilizing artificial intelligence, and mobile applications aiding transitions between education levels.

The workshop has also facilitated short-term mutual visits and exchanges programmes between Vocational and training Institutions in China and Machakos University staff and students, and through international skills and vocational competitions, such as the Huawei competition.

The visit from Tsinghua University students marks a significant step in fostering international collaboration and enhancing the research capabilities of Machakos University through the Luban Workshop.

NORWEGIAN PROGRAMME FOR CAPACITY DEVELOPMENT IN HIGHER EDUCATION AND RESEARCH FOR DEVELOPMENT (NORHED II) PROJECT SUMMER SCHOOL 2024

The Norwegian University of Life Sciences (NMBU) hosted the Summer School 2024, which saw participation from partner institutions, including Machakos University.

The three-week event brought together students from various academic levels to engage in training on two key topics: Water Resources Management and Advanced Water and Wastewater Treatment, as well as Urban Water Management in a Changing Climate.

Machakos University was proudly represented by two students, Faith Chepkoech and Philip Mutweleli Mutuku. The training comprised a blend of lectures and laboratory work, where participants conducted experiments on infiltration, urban water management modeling, and water resources management.

Additionally, the students gained hands-on experience with technological tools such as STOAT 5.0 wastewater design software, simulations for urban water management, and wastewater treatment plant component modeling.

The program also included visits to various sites, including the Oslo Wastewater Treatment Plant and NMBU Water Supply Center. As part of an excursion organized by the host university, students had the opportunity to cross over to Sweden by ferry. At the conclusion of the program, the students were awarded certificates of participation.

TRAINING IN GRANT PROPOSAL WRITING AND SOURCING OF FUNDS

A Training in Grant Proposal Writing and Sourcing of Funds was conducted on October 9, 2024, targeting academic staff. The workshop aimed to enhance the participants' skills in preparing competitive grant proposals and identifying funding opportunities to support research and institutional development. Facilitated by experts in grant writing and resource mobilization, the training provided practical insights into crafting compelling proposals, understanding donor priorities, and effectively navigating the funding landscape. Participants also gained knowledge on budgeting, compliance, and collaborative approaches to maximize funding potential. This initiative underscored the institution's commitment to building the capacity of its staff to secure resources for impactful research and innovation.

MACHAKOS UNIVERSITY RANKED 10TH IN THE TIMES HIGHER EDUCATION RANKING 2024

In a report released on 9th October 2024 by the Times Higher Education, Machakos University was ranked the 10th best university in Kenya in the year 2024. The ranking by the Times Higher Education was done in the core areas of higher education mission which include teaching (the learning environment), research environment (volume, income and reputation), research quality (the outputs of research), industry (knowledge transfer), and international outlook (staff, students and research).

MACHAKOS UNIVERSITY 2024 HACKATHON FESTIVAL

Machakos University successfully hosted the 2nd edition of the Machakos University Hackathon Festival from November 5th to 7th, 2024, at the University's Luban Workshop. This three-day event, organized in collaboration with the Machakos University Innovation Club, Microsoft Learn Student Ambassadors, Google Developer Groups on Campus and the Techno-Engineering Association, brought together students from diverse disciplines to develop sustainable solutions for real-world challenges.

The Hackathon Fest was officially opened by Prof. Stanley Makindi, Acting Deputy Vice-Chancellor for Research, Innovation, and Linkages, who represented the Vice-Chancellor. He emphasized the importance of innovation in bridging the gap between academia and industry. He encouraged participants to embrace collaboration, creative thinking, and teamwork throughout the event to address pressing societal issues.

The opening ceremony featured keynote addresses from industry leaders who provided valuable insights on modern technology and entrepreneurship: Eng. James Nyamai delivered a thought-provoking address titled "Reshaping Infrastructure: The Role of Smart Technology in Modern Engineering." He highlighted the transformative potential of technology in engineering solutions.

Mr. Allan Mwangi inspired participants with his presentation on "Building Sustainable Startups: Turning Creative Visions into Impactful Ventures." He discussed the process of transforming innovative ideas into viable, impactful businesses.



Event Theme and Focus

The theme for this year's Hackathon Festival was **“Sustainability in Engineering Technology Solutions.”** Participants tackled challenges in seven key categories:

- Water
- Agriculture
- Education
- Health
- Energy
- Transportation
- Out of the Box Solutions

Over 18 teams participated, showcasing their creativity, technical skills and teamwork through AI-driven projects that proposed innovative, sustainable solutions for contemporary challenges.

Top Achievements

The event concluded with the recognition of three outstanding teams for their groundbreaking projects:

1st Place: Phoenix Team

Category: Education

Project: Classmate

Phoenix Team developed Classmate, an AI-powered educational application designed to enhance student-lecturer interactions. Key features of the app include: Dual interfaces for seamless communication, automated scheduling and announcements, AI-assisted revision and progress tracking and streamlined onboarding for new students.

This app fosters a modern digital learning environment by improving communication, facilitating personalized learning, and tracking academic progress.

2nd Place: Fanaka Farm Team

Category: Agriculture

Project: Smart Farming Platform

The Fanaka Farm Team developed Smart Farming Platform; an innovative AI-powered solution aimed at revolutionizing agriculture for both large and small-scale farmers. The platform addresses key issues such as: Poor storage and post-harvest practices, limited access to farm machinery, Insufficient knowledge of modern farming techniques and farmer exploitation in market transactions. The project provides farmers with access to modern farming technologies, Equipment rental services, Live market connections for real-time pricing and price negotiation support.

This initiative will empower farmers to maximize productivity, reduce losses and increase profitability through the adoption of smart farming practices.

3rd Place: Great Core Team

Category: Health

Project: Serenity

The Great Core Team developed Serenity; an AI-powered mobile application that improves access to mental health care. This will address the growing mental health challenges in Kenya, especially among students. The innovation offers a personalized mental health assistant, a safe platform for conversations and guidance and immediate support for users experiencing distress. This application breaks down barriers to accessing mental health services, fostering a supportive environment and encouraging users to seek help without stigma.

The Machakos University 2024 Hackathon Festival demonstrated the exceptional talent, creativity, and innovative spirit of its students. The event fostered collaboration among diverse stakeholders, including academia, industry leaders, and student innovators, to tackle pressing societal challenges through sustainable technological solutions.

The outstanding projects presented during the Hackathon reflect the university's commitment to fostering innovation, supporting interdisciplinary learning, and preparing students to contribute meaningfully to solving global challenges. The success of this year's event sets a strong foundation for future editions of the Hackathon Fest, further strengthening Machakos University's reputation as a hub for innovation and technological advancement.



Students and staff during the Hackathon