



KeSEBAE NEWS



Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers

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Biomedical Engineering in Kenya

By Yvonne Madahana



In October 2025, Kenya mourned the death of former Prime Minister Raila Odinga. Although details surrounding his medical care remain limited, his passing renewed public debate about the state of healthcare in Kenya. Many citizens expressed concern that some of the country's top leaders continue to seek treatment abroad, reflecting the waning confidence in local medical services. The announcement by former President Uhuru Kenyatta that he is battling cancer added to these fears, as cancer remains one of the leading causes of death in Kenya even in 2025. This conversation is not new. In 2019, the deaths of Bomet Governor Dr. Joyce Laboso and Kibra Member of Parliament Ken Okoth from cancer drew national attention to the inadequacy of healthcare systems in the country. During Dr. Laboso's funeral, Kisumu Governor Prof. Anyang' Nyong'o called for a stronger focus on training health professionals and developing research capacities to support medical care. He noted that investing in people was just as important as building hospitals, since effective healthcare relies on skilled doctors, nurses and technical staff, including biomedical engineers, to manage and maintain medical technologies.¹ The COVID-19 pandemic later made clear how essential biomedical engineers are in sustaining Kenya's health system. As hospitals struggled with ventilator shortages, oxygen supply disruptions and malfunctioning diagnostic machines, biomedical engineers became indispensable in maintaining and repairing critical equipment.

DEAR READER

Welcome to KeSEBAE Newsletter.

A monthly Newsletter touching on topical issues affecting our environment.

KeSEBAE NEWS is a Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE)

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¹ Eng. Prof. Lawrence Gumbo, "Biomedical Engineering: The Urgent Need," *KeSEBAE News*, Vol. 1, No. 2, Thursday 29 August 2019.

Millicent Alooh, the National Secretary-General of the Association of Medical Engineering of Kenya, observed that the pandemic exposed both the importance of the profession and the urgent need to strengthen local biomedical engineering capacity to ensure the reliability of medical technologies in times of crisis.

Biomedical engineers play a pivotal but little-known role in healthcare. They design, install and maintain medical equipment in hospitals, including X-ray and MRI machines, oxygen plants and dialysis units. They ensure that life-saving devices function as intended. Unfortunately, Kenya imports nearly all its medical devices and struggles to keep them operational. The World Health Organization has noted that approximately 50 to 80 percent of medical equipment in low- and middle-income countries is non-functional, primarily due to a shortage of trained engineering and maintenance professionals.²

Biomedical engineering applies the principles of science and engineering to the design, planning and management of healthcare systems. It merges knowledge in engineering, medicine and human biology to develop technologies and techniques that improve both diagnosis and patient care. The field addresses engineering concerns across biotechnology, healthcare systems, amenities, human biology, pharmaceutical industries and environmental health.

The discipline of biomedical and health systems engineering includes several areas of specialization:

Clinical and Instrumentation Engineering

This area focuses on the design and development of devices used in the diagnosis and treatment of diseases. It combines engineering design and problem-solving with medical and biological sciences to enhance the delivery of healthcare. It includes technologies such as X-ray, ultrasound, MRI, CT and PET scanners, as well as radiotherapy machines, cardiovascular bioengineering, physiological systems modelling, and hearing and speech processing.



Figure 1: Magnetic Resonance Imaging (MRI) Machine

Biomedical and Rehabilitation Engineering

This specialization develops and adapts technologies to assist people living with disabilities or recovering from illness or injury. Examples include eyeglasses, artificial limbs, and other prosthetics. It also covers regenerative tissue growth, artificial blood, biodegradable materials, rehabilitation robotics, telemedicine and regenerative medicine.

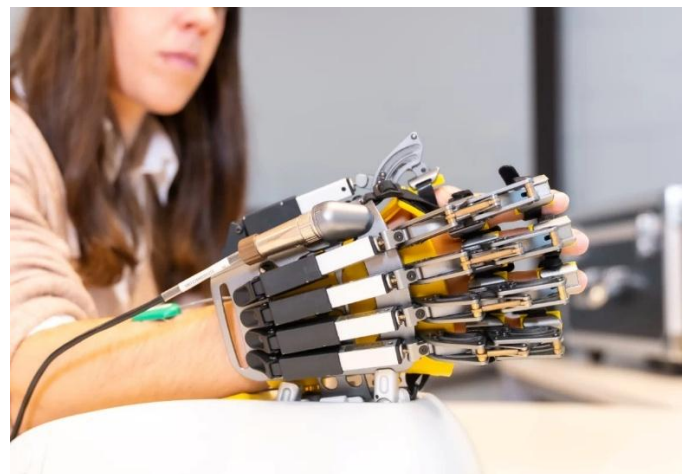


Figure 2: Robotic Exoskeleton Hand

Hospital and Health Systems Engineering

This field applies engineering principles and management to design and evaluate hospital infrastructure, waste management systems, safety systems and maintenance of equipment. It also involves planning health service delivery systems and enhancing operational efficiency in hospitals.

² World Health Organization. (2010). Medical Equipment Maintenance Programme Overview. WHO Press.

Public Health Engineering

This area uses engineering to design waste disposal systems and manage environmental health factors that prevent disease. It includes work on water quality, wastewater management, solid waste systems, disease vector control and air quality management in healthcare facilities.

Pharmaceutical and Biomolecular Engineering

This specialization focuses on the design and optimization of systems for producing medicines and medical supplies. It merges molecular biology and biophysical chemistry to improve pharmaceutical manufacturing, formulation, automation and packaging.

Policy, Regulation and System Reforms

The critical role of biomedical engineers has continued to attract attention in policy discussions. In 2015, Matungulu MP Stephen Mule sponsored the Biomedical Engineers Bill (National Assembly Bill No. 37 of 2015) in Parliament. He warned that an unqualified engineer could endanger lives by making minor but harmful adjustments to equipment such as X-ray machines, emphasizing the need for strong professional regulation. The Bill sought to create a legal framework for the training, licensing and supervision of biomedical engineers. However, progress has been slow, and as of 2025, the legislation remains under committee review.

Parallel to professional regulation, Kenya has embarked on broad health sector reforms. In late 2023, Parliament passed the Social Health Insurance Act, replacing the former National Health Insurance Fund (NHIF) with the Social Health Authority (SHA) and associated funds under the Universal Health Coverage (UHC) programme. This policy reform aims to make healthcare more affordable and accessible. While SHA has improved enrolment and access to basic services, the cost of medical care remains high partly due to equipment breakdowns and reliance on imported technologies. Hospitals continue to face long downtimes and costly maintenance because of limited local expertise.

To strengthen medical technology management, the government has also introduced system-level measures. In August 2025, the Ministry of Health announced a partnership with the Association of Medical Engineering of Kenya (AMEK) to review the National

Medical Devices Policy and establish a regulatory framework for biomedical engineers. The Principal Secretary affirmed the Ministry's commitment to repositioning the Biomedical Engineering Department and filling workforce gaps created by retirement and attrition.

Despite these policy, financial, and institutional reforms, Kenya still faces a shortage of skilled biomedical engineers and a weak regulatory environment. Without a well-trained and adequately supported technical workforce, the effectiveness of these reforms remains limited. It is within this context that efforts in education and training have become increasingly vital in building the next generation of biomedical professionals.

Building Capacity Through Education and Training

Developing a strong biomedical engineering workforce depends largely on education and training. However, despite Kenya's growing demand for biomedical expertise, only a few institutions currently offer formal programmes in this field.

Institutions offering biomedical engineering education in Kenya include:

- i. Kenyatta University: Offers a Bachelor of Science in Biomedical Engineering, launched in 2013, the only dedicated undergraduate degree in the country.
- ii. Egerton University: Offers a Bachelor of Technology in Industrial Technology (Biomedical Engineering option), established in 2003.
- iii. Technical University of Mombasa (formerly Mombasa Polytechnic): Offers a Diploma in Medical Engineering, which has been in existence since 1986.
- iv. Kenya Medical Training College (KMTTC): Offers diploma-level training for hospital technicians in medical equipment maintenance.

Partnerships and New Initiatives

Partnerships and new initiatives are beginning to strengthen Kenya's biomedical engineering capacity. In late 2024, Kenya and France launched the Silicon Savannah Innovation Park, centred at the University of Nairobi (UoN). The approximately KES 5 billion

Engineering and Science Complex (ESC), France's largest investment in higher education in Sub-Saharan Africa, will provide world-class laboratories and modern curricula.

The ESC is designed to promote multidisciplinary applied science and engineering, with a strong emphasis on health technology programmes. As part of this collaboration, UoN will soon offer engineering degrees at both undergraduate and postgraduate levels with a health and biomedical focus, complementing Kenyatta University's existing programme. The initiative, supported by the Agence Française de Développement and leading French universities, aims to enhance Kenya's capacity to innovate in medical devices, diagnostics, and healthcare technology management.

Other Kenyan universities are also moving in this direction. For instance, Jomo Kenyatta University of Agriculture and Science (JKUAT) is in the final stages of introducing a Bachelor of Science in Biomedical Engineering. At the same time, the Technical University

of Kenya is expanding their health and engineering science programmes to include biomedical and health technology components. These developments reflect growing recognition that biomedical engineering is central to the future of Kenya's healthcare system and industrial innovation.

Kenya spends an estimated £230 million annually on importing medical devices, yet much of this equipment remains unused due to limited maintenance capacity. The World Health Organization reports that up to 80 per cent of medical equipment in sub-Saharan Africa is non-functional, and Kenya's figures are comparably high. At the same time, the country is among the fastest-growing medical device markets in Africa, with rising demand for imaging, diagnostics and laboratory automation. Biomedical engineering stands at the centre of this transformation, not only linking medical science with technology but also driving innovation, self-reliance and sustainability in healthcare. Strengthening this profession is therefore key to building a resilient, efficient and accessible health system for all Kenyans.



2026 ANNUAL CONFERENCE

Theme
Artificial Intelligence for the Transformation of Agriculture, Industry, Infrastructure and the Environment

Sub-Themes

1. Transforming Africa's Agricultural Systems through Technology
2. Building Resilient Infrastructure for Sustainable Development
3. Engineering for Environmental and Climate Change
4. Transformation of Africa's Energy Systems
5. Engineering Transformation of Industry in Africa
6. Biomedical Engineering Interventions for Improvement of Africa's Health Systems
7. Engineering Training in the World of AI

Key Dates

- Abstract Submission: **31 Jan 2026**
- Paper Submission: **28 Feb 2026**
- Payment Deadline: **28 Feb 2026**
- Early Bird: **31 Dec 2025**

Charges

- Members: **KES 20,000**
- Non-members: **KES 25,000**
- Foreigners: **\$250**
- Virtual: **KES 10,000**
- Undergrad Students: **KES 2,000**
- Field Visit: **KES 5,000**

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2026 Annual CONFERENCE

Tue 24 - Fri 27 March University of Nairobi

Call for Papers

Abstracts Submission: 31 Jan 2026
PowerPoint Submission: 28 Feb 2026
Submission of Full Papers: 13 March 2026

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5. Engineering Transformation of Industry in Africa
6. Biomedical Engineering Interventions for Improvement of Africa's Health Systems
7. Engineering Training in the World of AI

Note: The abstract should be between 250-300 words. The full paper should be 3,000-8,000 words, in Times New Roman, font size 12, spacing of 1.5 in editable text format (.doc) using APA 6th Edition citation style.

All writings should be emailed to:
info@kesebae.or.ke



CALL FOR PAPERS

To the Next Editions of the JEAE

JEAE

Journal of Engineering in Agriculture and the Environment

The Journal of Engineering in Agriculture and the Environment (JEAE) is a Publication of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE) through which researchers in the fields of Environment, Agriculture and related fields share research information and findings with their peers from around the globe.

The JEAE Editorial Board wishes to invite interested researchers with complete work in any relevant topic, to submit their papers for publication in the next editions of the Journal.

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Criteria for Article Selection

Priority in the selection of articles for publication is that the articles:

- | | |
|--|---|
| <ul style="list-style-type: none">a. Are written in the English languageb. Are relevant to the application of engineering and technology in agriculture, the environment and biological systemsc. Have not been previously published elsewhere, or, if previously published are supported by a copyright permissiond. Deals with theoretical, practical and adoptable innovations applicable to engineering and technology in agriculture, the environment and biological systemse. Have a 150 to 250 words abstract, preceding the main body of the article | <ul style="list-style-type: none">f. The abstract should be followed by the list of 4 to 8 "Key Words"g. Manuscript should be single-spaced, under 4,000 words (approximately equivalent to 5-6 pages of A4-size paper)h. Should be submitted in both MS word (2010 or later versions) and pdf formats (i.e., authors submit the abstract and key words in MS Word and pdf after which author uploads the entire manuscript in MS word and pdf)i. Are supported by authentic sources, references or bibliography |
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Member	2,000	1,000	2,000
Ass. Member	1,000	1,000	2,000
Aff. Member	500	1,000	2,000
Student	300	100	-

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Currency	Kenya Shillings

Membership Renewal

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Membership Category	Annual Subscription Fee (KES)
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Member	2,000
Ass. Member	1,000
Aff. Member	500
Student Member	300

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