

IEEEIES JENGA COMMUNITY COLLOQUIUM 2025





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Innovating for Sustainable Health: The Role of Biomedical Engineers in Advancing Universal Health Coverage in Kenya

REPORT | 2025



February, 27TH 2025



Kenyatta University Teaching, Referral & Research Hospital (KUTRRH)

EXECUTIVE SUMMARY

The IEEE IES Jenga Community Colloquium 2025, held with the theme "Innovating for Sustainable Health: The Role of Biomedical Engineers in Advancing Universal Health Coverage in Kenya," was a great coming together of academia, industry professionals, and students, promoting knowledge sharing and innovation. As the first Meetup of its kind hosted in Kenya, it set a strong foundation for future colloquia, proving that interdisciplinary collaboration between academia and industry is not just valuable but necessary. Supported by top Partners, the colloquium provided an interactive platform to explore biomedical engineering, Context-based technologies, and healthcare solutions. With insightful talks by professionals, high-energy Red Bull Networking Sessions, and a successful student Project Pitch and Showcase.

The colloquium promoted innovative ideas and also helped increase interaction between aspiring innovators and experienced professionals. One of the key attractions of the colloquium was the tour of the Integrated Molecular Imaging Centre at Kenyatta University Teaching Referral & Research Hospital, where the attendees got first-hand experience of state-ofthe-art Nuclear Medicine technologies, including the Cyclotron, PET/CT, and SPECT/CT Machines etc. This interactive session complemented the technical talks, offering real-world experiences with cutting-edge medical imaging advancements. By bringing together expert discussion, student-led innovations, and clinical applications, the colloquium encouraged participants and highlighted the critical role of biomedical engineers in shaping the future of sustainable healthcare and universal health coverage.

Mission & Goal

Mission: To foster interdisciplinary collaboration by uniting stakeholders from engineering, medicine, and computer science to drive innovative solutions for achieving Universal Health Coverage (UHC) in Kenya.

Goal: To promote knowledge-sharing, research partnerships, and technology-driven approaches that advance sustainable and inclusive healthcare systems.



OBJECTIVES

- Facilitate collaboration between engineering, medical, and computer science professionals to develop innovative healthcare solutions.
- Enhance research and development initiatives that drive sustainable healthcare advancements.
- Provide a platform for knowledge-sharing, best practices, and networking among stakeholders.
- Showcase emerging technologies and their role in improving healthcare systems and achieving Universal Health Coverage (UHC).
- Establish mentorship opportunities & programmes to empower students and young professionals in healthcare innovation and interdisciplinary collaboration.

EXPECTED OUTCOMES

- Development of practical healthcare solutions that address Kenya's unique challenges using technology and innovation.
- Stronger connections between universities, industry/Hospitals experts, and healthcare professionals to drive impactful collaborations.
- Increased research projects and knowledge-sharing platforms that combine engineering, medical, and computer science insights to improve healthcare services.
- Mentorship programs that guide students and young professionals in developing skills for healthcare innovation.
- Actionable insights and recommendations to influence policies that support Universal Health Coverage (UHC) in Kenya.
- Enhancement on policy documents for management of medical equipment.

SIGNIFICANCE OF THE IEEE IES JENGA COMMUNITY COLLOQUIUM

- Interdisciplinary Collaboration: Bridges the gap between engineering, medical sciences, and computer science to drive innovative healthcare solutions.
- Knowledge Sharing: Provides a platform for academia, industry experts, and healthcare professionals to exchange ideas and insights.
- Healthcare Innovation: Encourages the development of practical solutions that address Kenya's healthcare challenges and support Universal Health Coverage (UHC).
- Mentorship, and Career Development: Offers guidance, learning opportunities, and industry connections to support students and young professionals in exploring diverse career paths in healthcare innovation.
- Promoting Sustainability in Healthcare: Focuses on developing long-term, eco-friendly, and resource-efficient healthcare solutions to improve service delivery and patient outcomes.
- Exposure to Context-Based Technologies: Showcases innovative technologies designed to address Kenya's unique healthcare needs and environments.
- Sustainable Impact: Promotes long-term solutions by fostering collaboration, research, and innovation in healthcare.

ORGANIZING COMMITTEE

The colloquium 2025 co-hosted by three key institutions committed to innovation and sustainable healthcare solutions:

- 1. Kenyatta University Teaching, Referral & Research Hospital (KUTRRH) "Quality patient centered care" A leading healthcare institution excelling in specialized treatment, training and research. The colloquium was hosted by KUTRRH's Biomedical Engineering Department, led by Eng. Anthony Chuani.
- 2. **IEEE Kenya Section** "Advancing Technology for Humanity." A professional body dedicated to promoting technological innovation, knowledge sharing, and professional growth.
- 3. **IEEE Industrial Electronics Society (IES) Kenyatta University Chapter** "Engineering a Better Tomorrow." A student-led chapter advancing industrial electronics and fostering research, mentorship, and innovation.

The Organizing Committee played a pivotal role in ensuring the seamless execution of the **IEEE IES Jenga Community Colloquium 2025**. Their responsibilities spanned logistics, technical activities, publicity, project showcase, and mentorship. Each team contributed to delivering a well-coordinated event that successfully connected academia and industry, promoted emerging technologies, and facilitated impactful knowledge exchange.

Led by **Pius M. Kariuki (Lead)** and **Linet Muthoni (Co-Lead)**, the committee's dedication and teamwork were key to the event's success, from planning to execution.

Executive Committee

Advisors



Dr. Kennedy Iloka Advisor



Eng. Anthony Chuani Advisor





Executive Committee







Kariuki Pius Muriuki _{Lead}



Linet Muthoni Gitonga Co-Lead



lan Blix Kingʻoro Industrial Liaison



Patrick Charles Mulwa Technical Activities



Isiah Okoth Odhiambo Logistics Lead



Elijah Kiprop Kangogo Publicity Lead



Ruud Van Nestrooy Ouma Design Lead

Organizing Members



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KEY ACTIVITIES

The colloquium featured a diverse range of activities designed to promote learning, collaboration, and innovation. The program included insightful keynote presentations, engaging Rump panel discussions, and interactive technical workshops that explored emerging trends across various fields. Participants had the opportunity to showcase their innovative projects, connect with peers through networking sessions, and engage in rejuvenating icebreaker sessions that encouraged interaction and teamwork.

Here's a closer look at the standout moments:







OPENING REMARKS

The colloquium was officially opened with remarks from Eng. Anthony Chuani, delivered on behalf of the KUTRRH Hospital Administration. In his address, Eng. Chuani highlighted the hospital's ongoing commitment to advancing biomedical engineering through innovative training strategies and academic enrichment programs. He emphasized the importance of fostering interdisciplinary collaboration to drive healthcare innovation. Eng. Chuani also expressed his gratitude for the opportunity to host Kenya's first-ever Biomedical Engineering Meetup, underscoring the hospital's dedication to promoting innovation and sustainable healthcare solutions. His remarks set the tone for impactful engagements, as participants eagerly anticipated the insightful sessions ahead.

IEEE INDUSTRIAL ELECTRONICS SOCIETY PRESENTATION



Pius M. Kariuki introduced IEEE and provided attendees with an insightful overview of the IEEE Industrial Electronics Society (IES). He highlighted the society's objectives, emphasizing its role in advancing engineering solutions for industrial and healthcare applications. Pius also outlined IES's 2025 Strategic Plan, emphasizing the society's focus on promoting innovation, technology transfer, and interdisciplinary collaboration. He expressed his appreciation to the attendees for their participation and encouraged them to engage actively in the upcoming innovation showcase, reinforcing the importance of knowledge exchange for impactful solutions.





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KEYNOTE ADDRESSES

KEYNOTE 1: KUTTRH AND ITS CONTRIBUTIONS TO BIOMEDICAL ENGINEERING AND HEALTHCARE SOLUTIONS



Speaker: Eng. Anthony Chuani

Eng. Anthony Chuani set the stage with an insightful discussion on how KUTTRH is driving innovation in biomedical engineering. He walked attendees through key advancements in medical imaging, patient monitoring systems, and hospital automation. His message was clear: engineers and healthcare professionals must work together to enhance patient care and improve healthcare infrastructure. The talk sparked conversations on the role of engineers in bridging the gap between research and real-world medical applications.



Speaker: Prof. Shiban Koul

Prof. Shiban Koul took the audience on a deep dive into the world of medical devices, highlighting how electromagnetic waves — from MHz to Sub-Thz — are revolutionizing healthcare. He broke down the challenges posed by electromagnetic interference (EMI) and electromagnetic compatibility (EMC), illustrating how they can impact medical equipment performance. The session left attendees with a greater appreciation of the precision required in biomedical engineering and the importance of addressing these challenges early in the design phase



KEYNOTE ADDRESSES

KEYNOTE 3: ROLE OF THE INTERNET OF THINGS IN BIOMEDICAL ENGINEERING



Speaker: Isaac Wekesa

Isaac Wekesa captivated the audience with a glimpse into the future—one where IoT-enabled devices redefine patient care. He explored real-world applications of IoT in healthcare, from wearable health monitors to remote diagnostics. Attendees were particularly interested in how IoT, combined with artificial intelligence, is paving the way for predictive healthcare models that could revolutionize early disease detection and management.



Speaker: Vaishaili Verdana - G-Tech

Vaishaili Verdana introduced the audience to the groundbreaking world of brain-computer interfaces (BCI) and their transformative impact on stroke rehabilitation. She explained how BCI technology is giving stroke patients new hope by enabling them to regain motor functions through neurofeedback mechanisms. Her session sparked curiosity about the future of neurotechnology and how it could redefine rehabilitation medicine.



KEYNOTE ADDRESSES

KEYNOTE 5; ENHANCING BIOMEDICAL ENGINEERING TECHNOLOGY WHILE UPHOLDING HOSPITAL STANDARDS FOR EXCELLENCE IN HEALTHCARE

Speaker: Medware

Medware, a leader in the biomedical industry, delivered a compelling session on the delicate balance between innovation and hospital standards. Their presentation emphasized the importance of regulatory compliance, ethical considerations, and ensuring that medical devices meet global healthcare benchmarks. Attendees walked away with a deeper understanding of how new medical technologies can be seamlessly integrated into hospital systems without compromising safety or efficiency.

Eng. Martin Nzomo

From Kenyatta University, he delivered a powerful presentation emphasizing the vital role of academia in driving healthcare innovations. He stressed the importance of students "thinking outside the box — in fact, stepping out and on it" to unlock creativity and pioneer impactful solutions. Eng. Nzomo encouraged students to embrace bold ideas, push the boundaries of conventional thinking, and leverage academic research to address real-world healthcare challenges. His inspiring message underscored the limitless potential of innovative thinking in transforming healthcare.

KEYNOTE 3: THE ROLE OF

ACADEMIA IN ADVANCING

INNOVATION IN HEALTHCARE



RAPID-FIRE ICEBREAKER SESSION

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An energizing session led by Red Bull that encouraged participants to engage in quick, thought-provoking interactions to foster teamwork and idea-sharing. Thanks to Redbull, attendees got more than just an energy boost. Each participant received a complimentary bottle of Redbull and was encouraged to take part in Redbull's interactive challenges by scanning QR codes on their bottles. These icebreaker sessions brought a lively and engaging atmosphere to the event, helping attendees connect in a fun and informal way.







THE ROLE OF BIOMEDICAL ENGINEERS IN NUCLEAR MEDICINE

Speaker: Eng. Emmanuel Njoroge

Eng. Emmanuel Njoroge provided a fascinating look into the world of nuclear medicine, an area that remains a mystery to many. He explained how biomedical engineers play a vital role in radiation safety, imaging techniques, and the development of radiopharmaceuticals used in both diagnosis and treatment. His session shed light on an often-overlooked aspect of biomedical engineering, inspiring attendees to explore career opportunities in this critical field.





EXHIBITION PROJECTS: PROJECT SHOWCASING/PRESENTATION

Students presented innovative projects aimed at addressing real-world healthcare challenges, providing a platform to demonstrate their creativity and technical skills. Shortlisted Projects Presentations included:

- 1. PREVENTING COMPLICATIONS OF SLEEP DISTURBANCE IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER USING LORAWAN ENABLED IOT DEVICES IN REMOTE PATIENT MONITORING
- 2. Biomed Tracker
- 3. NON-INVASIVE POSITIONING AND MONITORING SYSTEM FOR TKA
- 4. Automated Oxygen Therapy Administration System
- 5. Biosensing Innovation: Integrating NFC and Bluetooth for Non-Invasive Health Monitoring
- 6. VENERA Medical Gas Pipeline Management System

Industria









PANEL RUMP SESSION

A dynamic Rump discussion moderated by Pius M. Kariuki featured experts including Willis Otondi, Sylvanus Maraga, and representatives from the IEEE IES and Kenyatta University. Discussions covered emerging trends, innovation strategies, and practical approaches to advancing sustainable healthcare solutions. Willis Otondi highlighted the role of EMBS and mentorship in guiding biomedical engineering professionals. Sylvanus Maraga, Project Manager at MedWare Solutions, emphasized the critical role industries play in supporting academia through mentorship and knowledge exchange. He encouraged innovators and students to engage actively in MedWare's R&D and Education Forum, stressing industry's willingness to collaborate with academia for enhanced innovation outcomes.

HOSPITAL TOUR

Attendees explored KUTRRH's Integrated Molecular Imaging Centre, where they experienced firsthand the advanced medical imaging technologies, one of the most anticipated activities. Attendees had the rare opportunity to witness firsthand how biomedical engineering principles are applied in a real healthcare setting. From advanced imaging centers to cutting-edge diagnostic tools, the tour offered a tangible connection between theory and practice. It was an eye-opening experience that reinforced the importance of engineering in modern healthcare.





CLOSING REMARKS & PHOTO SESSION

The colloquium concluded with closing remarks by Mr. Kamau, Kenyatta University Faculty Member, acknowledging the contributions of all participants, speakers, and organizers. A group photo session followed to mark the success of the colloquium.

ORGANIZING COMMITTEE RECOGNITION AND PARTNER APPRECIATION AWARDS



To acknowledge the dedication and support of key contributors, the organizing committee presented Appreciation Certificates to organizing members for their outstanding efforts. Tokens of Appreciation certificates were awarded to industries and speakers in recognition of their invaluable contributions throughout the event. To celebrate the success of the colloquium, the organizing team hosted a Nyama Choma Connect, providing a relaxed atmosphere for participants to network, reflect on the event's achievements, and strengthen professional bonds.

ACHIEVEMENTS

The IEEE IES Jenga Community Colloquium 2025 successfully achieved several key milestones that contributed to its impactful outcomes:

- 1. Industry-Academia Collaboration: Successfully connected academia and industry through insightful speaker sessions and industry visits, fostering knowledge exchange and innovation.
- 2. Skill Enhancement: Provided practical knowledge on emerging healthcare technologies such as IoT in Healthcare, Brain-Computer Interfaces, and Medical Device EMI/EMC Challenges.
- 3. Networking Opportunities: Facilitated meaningful connections through interactive sessions like the Red Bull Icebreaker encouraging collaboration and mentorship.
- 4. Exposure to Cutting-edge Innovations: Offered participants firsthand experience with advanced medical imaging technologies, including the Cyclotron, PET/CT, and SPECT/CT.
- 5. Empowerment through Mentorship: Delivered impactful mentorship sessions that provided career guidance, technical insights, and professional development support.



CLOSING REMARKS & PHOTO SESSION























CHALLENGES INCURRED

The challenges faced during the execution of the IEEE IES Jenga Community Colloquium 2025 included:

- 1. Time Constraints: While the event was highly successful, the single-day schedule limited deeper engagement and discussions, highlighting the need for an extended program in future editions.
- 2. Mentorship Follow-up: While mentorship sessions were impactful, establishing structured follow-up programs for continued guidance proved challenging.
- 3. Financial Constraints: Limited funding and delayed disbursement from the section affected key planning processes, requiring adjustments to budgets and timelines to ensure successful execution.
- 4. Industry-Academia Collaboration: Coordinating schedules with key industry players for speaker sessions and visits required extensive planning and flexibility.

CONCLUSION

The IEEE IES Jenga Community Colloquium 2025 was a resounding success, achieving its mission of fostering innovation, knowledge transfer, and industry-academia collaboration. Through insightful presentations, engaging discussions, and hands-on experiences, the event highlighted the vital role of technology and academia in advancing healthcare solutions. Despite some logistical challenges, the colloquium effectively equipped participants with valuable insights and practical skills to thrive in biomedical engineering and healthcare innovation. The Colloquium not only inspired new ideas but also laid a strong foundation for future collaborations between academia, industry, and healthcare institutions. As the inaugural edition, this colloquium set a high standard, paving the way for even greater impact in future engagements.

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