

#### COMMISSION FOR UNIVERSITY EDUCATION NAIROBI, KENYA

THEME: CATALYZING SYSTEMIC SOCIAL TRANSFORMATION THROUGH RESEARCH AND INNOVATION

> PROGRAMME, SPEAKER PROFILES AND BOOK OF ABSTRACTS

4TH BIENNIAL CONFERENCE ON UNIVERSITIES RESEARCH AND INNOVATION

12<sup>TH</sup> - 14<sup>TH</sup> JUNE 2024

**COMMISSION FOR UNIVERSITY EDUCATION**.1

A publication of the Commission for University Education (CUE)

#### FOREWORD

The Commission for University Education (CUE) is established by the Universities Act No.42 of 2012 to regulate and assure quality in University Education in Kenya, by setting standards and guidelines on teaching, research, and outreach; and monitoring compliance to achieve global competitiveness. The mandate of the Commission for University Education includes among others, promoting the objectives of university education in Kenya, promoting quality research and innovation, collecting, disseminating, and maintaining data on university education as well as advising the Cabinet Secretary on Policy relating to university education. Research and innovation has been earmarked as one of the enablers of the Kenya Vision 2030.

The Commission's role in the Medium-Term Plan IV (2023-2027) is to promote the objectives of university education, by regulating and accrediting universities and programmes, among other functions.

The Commission with other stakeholders organized the 4th Biennial Conference on Catalyzing Systemic Social Transformation Through Research and Innovation from 12th to 14th June, 2024 to reflect on Research and Innovation as Catalysts for Systemic Societal Transformation. Key issues discussed included: Preparing Graduates for the Workforce of Tomorrow, Catalyzing the Research Ecosystem, Sustainable and Ethical Research, Digital Superhighway and Creative Economy and Research and Innovation Exhibition.

This publication contains papers which have been subjected to a rigorous peer review process, The 4th biennial conference program and speaker's profile.

We hope that it will be a key resource material for the academics, students and other stakeholders in the Higher Education Sub-Sector and lay a foundation for policy framework in the Ministry of Education.

#### PROF.CHACHA NYAIGOTTI -CHACHA CHAIRMAN, COMMSISSION FOR UNIVERSITY EDUCATION



#### ACKNOWLEDGEMENT

The 4th Biennial Conference on Research and Innovation themed Catalyzing Systemic Social Transformation Through Research and Innovation" reflects a global movement in university education. Universities are increasingly recognized as powerful agents of change, with the potential to address complex societal challenges and drive progress. This conference focuses on the critical role of research and innovation in achieving this systemic transformation.

The Conference would not have been successful without the contribution of several people. We would like to express our appreciation to our sponsors who gave generously towards the funding of the conference and Kenyatta International Convention Centre (KICC) who hosted the conference from 12th to 14th June 2024. We are greatly indebted to you.

We applaud the members of the Conference steering Committee chaired by Dr. David Muthaka, who worked tirelessly to organize the conference. We especially thank all the local, regional, and international participants and the entire Commission for University (CUE) Education fraternity who played various roles during the conference week and made it a great success.

Our gratitude also goes to Hon. Ezekiel Machogu, the Cabinet Secretary and Dr. Beatrice Inyangala,

Principal Secretary, State Department for Higher Education and Research - Ministry of Education; other Government officials and University representatives for their support during the planning, and for gracing the opening ceremony.

In a special way, we appreciate all our speakers for honoring the conference with their keynote presentations both physically and virtually. In the same breadth, we acknowledge the immense contribution of all paper presenters, panelists and discussants, chair of sessions and rapporteurs without which this publication would not be realized.

I also thank the team that spearheaded the review of the papers presented during the conference and ensured that they met the required threshold. I thank the authors for working with us and submitting their final papers which are compiled in this publication.

#### **PROF. MIKE KURIA**

#### COMMISSION SECRETARY/CEO

COMMISSION FOR UNIVERSITY EDUCATION



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#### Chief Guest: HON EZEKIEL MACHOGU, EGH

**Cabinet Secretary, Ministry of Education** 

Hon. Ezekiel Machogu is a seasoned career civil servant and administrator. Before his appointment as Cabinet Secretary, Hon. Machogu was the Member of Parliament for Nyaribari Masaba Constituency from 2017 to 2022.

While serving in the 12th Parliament, he served as the Chairperson of the National Assembly Committee on Members, Service and Facilities; and as a Member of the Committee on Regional Integration.

Hon. Machogu has served as Senior Deputy Secretary in the Ministries of Arid and Semi-Arid Lands, Trade and Tourism, and the Public Service Commission from 2002 to 2016; as Deputy Provincial Commissioner of the Coast Province from 2001 to 2002; District Commissioner for Wajir, Busia and Nyandarua Districts from 1989 to 2001; and as District Officer of Tetu, Nyandarua, Oljororok, Kianyaga, Nandi, Naivasha, and Kikuyu Divisions from 1978 to 1989.

Hon. Machogu is an alumnus of the University of Nairobi where he undertook his Bachelor of Arts degree in Political Science (Government and Sociology).

He has also attended numerous senior management courses locally and across the world over the course of his long-standing career in the civil service.

# CONFERENCE SPEAKERS

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# **PROF. RAPHAEL MUNAVU, EBS**

#### Chairman Konza Technopolis Development Authority (KoTDA)

Professor Raphael Munavu is a distinguished figure in Kenya's academic and public service sectors, renowned for his extensive contributions to education, science, and national development. He is currently a Professor Emeritus in the Department of Chemistry at the University of Nairobi, the Chairman of the Presidential Working Party on Education Reforms in Kenya (September 2022 to present), Technology & Innovation (NACOSTI) since October 2021.

Prof. Munavu's academic journey began in the United States, where he attended Kalamazoo College (B.A. 1967-1970), Wayne State University (M.Sc. 1970-1972), and the University of Detroit (Ph.D. 1972-1975). He specialized in Organic, Environmental, and Industrial Chemistry.

With a career spanning over 35 years, Prof. Munavu has held numerous key positions in academia and public service. He served as the Chairman of the Kenya National Academy of Sciences (KNAS) for 19 years (2002-2021), Chancellor of Laikipia University for five years (February 2013

– February 2018), and Commissioner at the Constitutional Commission on Revenue Allocation (CRA) for six years (December 2010 – December 2016).

His roles in academic administration include being the Dean of the Faculty of Science at the University of Nairobi (1987-1990), founding Principal of Laikipia College of Egerton University (1990-1992), Vice-Chancellor of Egerton University (1992-1994), Deputy Vice-Chancellor (Administration and Finance) at the University of Nairobi (1994-1998), and Vice-Chancellor of Moi University (July 14th, 1998 to September 19th, 2002). He played a pivotal role in establishing International Programs Offices at the University of Nairobi (1995) and Moi University (1999), and the Privately Sponsored Students Programs at Moi University (1998).

Prof. Munavu has published over ninety refereed and commissioned papers and supervised twenty-one postgraduate students. His research has focused on the role of higher education, chemistry, science, technology, and innovation in socioeconomic development. He has also consulted extensively on the environmental impacts of utilizing natural resources.

In addition to his academic contributions, Prof. Munavu has held several high-impact leadership positions. He was the Chairman of the Kenya

National Examinations Council (KNEC) for ten years (2000-2010) and served as Hon. Secretary of the Association of Faculties of Science of African Universities (AFSAU, 1986-1992). He was a member of the Presidential Task Force on Public Universities Inspection Board (PUIB, 2005-2007) and the Strategy for University Education in Kenya (2006-2008). He was also the founding Chairman of the Council of the South Eastern University College (SEUCO), now South Eastern Kenya University (SEKU), from 2008 to 2013

Prof. Munavu has been honored with several national awards, including the Order of the Grand Warrior (OGW, 1994) and the Elder of the Burning Spear (EBS, 2001). He received an honorary doctorate of Humane Letters, Honoris causa (D.Litt) from Kalamazoo College (USA) in 2001

and an honorary Doctor of Science degree from Laikipia University in 2013, recognizing his efforts in promoting inter-university linkages and advancements in higher education.

Prof. Munavu is dedicated to serving society through initiatives that create wealth, empower communities, and build capacities based on education, national heritage, indigenous knowledge, science, and technology. He advocates for value-adding enterprises utilizing Kenya's natural resources and human capacities.

Professor Raphael Munavu's illustrious career and unwavering commitment to education and public service have significantly impacted Kenya's academic and scientific landscapes, driving progress and innovation in these crucial sectors.



#### **PROF. JAMIL SALMI**

Jamil Salmi is a global tertiary education expert providing policy advice and consulting services to several governments, universities, multilateral banks and bilateral agencies.; Until January 2012, he was the World Bank's tertiary education coordinator. He wrote the first World Bank policy paper on higher education in 1994 and was the principal author of the Bank's 2002 Tertiary Education Strategy entitled "Constructing Knowledge Societies; New Challenges for Tertiary Education"; In the past twenty years, Dr. Salmi has provided policy advice on tertiary education reform and strategic planning to governments and university leaders in more than 80 countries all over the world. Dr. Salmi is a member of the international advisory board of several universities in Europe, Asia and Latin America.; He is also a member of the International Advisory Network of the UK Leadership Foundation for Higher Education, and the Editorial Committee of OECD's Journal of Higher Education Management and Policy.; Between 2008 and 2011, he represented the World Bank on the Governing Board of the International Institute for Educational Planning. Dr. Salmi's 2009 book addresses the "Challenge of Establishing World-Class Universities"; His latest book, co-edited with Professor Phil Altbach, entitled "The Road to Academic Excellence: The Making of World-Class Research Universities", was published in September 2011.;



# **PROF. CHACHA NYAIGOTTI-CHACHA**

#### Chairman, Commission for University Education

Prof. Nyaigotti-Chacha is currently serving as the Chairman of the Kenyan Commission for University Education (CUE). Prof. Chacha previously served as an executive secretary of the Inter-University Council for East Africa (2000–2010) and was the first CEO of the Kenyan Higher Education Loans Board (1995–2000). He is a Kenyan playwright and consummate educationalist.

Prof. Chacha received a Bachelor of Education (Swahili Language) from Kenyatta University and later studied at Yale University for an MA in Anthropological Linguistics and a Ph.D. in Swahili Language.



# **DR. BEATRICE INYANGALA**

#### Principal Secretary State Department for Higher Education and Research

Dr. Beatrice Inyangala has a Bachelor of Arts degree in Economics and Geography and master's in planning and economics for Education. She served in several universities including Moi University, Masinde Muliro University of Science and Technology and Mombasa Technical Training Institute.

Dr. Inyangala also served at the Commission for University Education

as planning officer in charge of research. Prior to joining the Ministry, the PS worked on PEDAL project at the Partnership for African Social and Governance Research (PASGR).

She also participated in developing a medium plan for education and planning policy for accelerated university intake when President William Ruto was the Education Cabinet Secretary.



#### **PROF. MIKE KURIA**

CEO/Commission Secretary Commission for University Education

Prof. Mike Kuria is the CEO of the Commission for University Education (CUE), in Kenya. Prior to joining CUE, he served as the Deputy Executive Secretary of the Inter-University Council for East Africa (IUCEA) whose mandate included quality of higher education in the East African Community (EAC) Partner States. Prof. Kuria has wide experience in higher education and quality in the in the EAC. From 2011-2015 he was the coordinating expert for a regional higher education quality assurance initiative by IUCEA in partnership with the German Academic Exchange Services (DAAD) in which he coordinated several capacity-

building exercises including a regional QA framework for East Africa with supporting Handbooks "A Roadmap to Quality". He was the founding Secretary General of the East African Quality Assurance Network (EAQAN).

In Kenya, Prof Kuria was the founding director of the Centre for Quality Assurance at Daystar University in Nairobi, Kenya where he served for 10 years.

He holds a PhD in English from the University of Leeds, UK.



#### **PROF. DANIEL MUGENDI**

#### Vice Chancellor University of Embu Chairman of the Association of Vice Chancellors of Public Universities in Kenya

Professor Daniel Mugendi Njiru is a renowned scholar, researcher, and consultant with illustrious management expertise. His career in academia, research, education, and training sectors, spanning over more than three decades, has seen him make significant contributions in the area of agro-ecosystems research and management as well as the development of university education in Kenya.

He began his career as a researcher with the Kenya Forestry Research Institute (KEFRI) in July 1986 and made tremendous professional and academic progress. In 1999, he moved to Kenyatta University (KU), where he rose through the ranks of academic and professional leadership. He served as the Chairman of the Department of Environmental Foundations, Dean of the School of Environmental Studies and Human Sciences, and Deputy Vice-Chancellor for Finance, Planning, and Development at Kenyatta University.

Currently, Prof. Mugendi is the Vice-Chancellor of the University of Embu. He also holds several significant positions: Chairman of the Board of Directors at Cytonn Investments Management Limited, Chairman of the Board of Management at Kirege Secondary School in Chuka, Tharaka Nithi County, and Lead Expert in Environmental Impact Assessment/ Audit. His previous leadership roles include Chairman of the Board of Directors at KEFRI, Regional Secretary General and Chairman of the Soil Science Society of East Africa, and Chairman of the African Network (AfNet) of the Tropical Soil Biology and Fertility Programme.

Prof. Mugendi has conducted groundbreaking research focusing on agriculture, forestry, and environmental policy and sustainability. He has collaborated extensively with communities, national and international partners in diverse research fields and higher education leadership. As a scholar of international repute, he has authored nine books and sixty-four chapters in books, in addition to publishing over eighty refereed articles and research papers in both national and international peer-reviewed journals. He has supervised and graduated thirty-six master's students and fourteen Ph.D. students. Furthermore, he continues to lecture, supervise postgraduate students, and conduct research in forestry, agriculture, and natural resource management. Prof. Mugendi has also participated in and presented scientific papers at more than ninety conferences.

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# VERY REV. PROF. FR. **STEPHEN MBUGUA**,

Vice Chancellor **Catholic University of Eastern Africa** Chairman of the Association of Vice Chancellors of **Public Universities in Kenya** 



Very Rev. Prof. Stephen Mbugua Ngari is the Rector and Vice-Chancellor of The Catholic University of Eastern Africa (CUEA). Very Rev. Prof. Mbugua is a Diocesan Priest from the Diocese of Nakuru. He holds a Doctor of Philosophy degree in Educational Psychology from Egerton University, a Master of Science degree in Psychology from Rochester Institute of Technology (USA), a Bachelor of Arts degree in Psychology from St. John Fisher College (USA), a Diploma in Theology from St. Thomas Aquinas Universities (KAPU). He sits in the Board of Kenya Universities Seminary, and a Certificate in Philosophy from St. Augustine's Seminary Mabanga. He has published widely and supervised postgraduate students.

He has held various positions in his career in education, which include:

- Rector/Vice-Chancellor at The Catholic University of Eastern Africa.
- Vice-Chancellor Designate at Tangaza University College • of Nakuru.

- Director of University Welfare Services at Egerton • University
- Dean of Students at Egerton University
- Catholic Chaplain for Egerton University. •
- Principal of St. Joseph's Minor Seminary in Molo •

He is the Chairperson of Kenya Association of Private and Colleges Central Placement Services (KUCCPS). Very Rev. Prof. Mbugua is also the Vice President of the International Federation of Catholic Universities (IFCU).

In his pastoral life, Very Rev. Professor Mbugua serves as the Chairman of Catholic Diocese of Nakuru Education Board and as a member of Catholic Diocese of Nakuru Bishops College of Consultors. He has also served as a Vicar at the Catholic Diocese



Executive Secretary, Inter University Council for East Africa (IUCEA)



Prof. Banyankimbona is the 5th Executive Secretary of the Inter-University Council for East Africa (IUCEA) since April 2021. He has over a decade of uninterrupted hands-on higher education experience at management and policy-making levels. He has held major leadership positions in higher education in Burundi including head of department at the University of Burundi; Vice-Chancellor of the University of Burundi; and Permanent Secretary and later Minister of Higher Education and Scientific Research, Burundi, through which he has been involved in national and regional higher education reforms and policy development processes; higher education and research projects; and academic programs coordination and implementation. He is an Associate Professor of Biology at the University of Burundi.



# MONICA BLAGESCU

Head of Education | Kenya, British Council

Monica Blagescu is the Head of Programmes at the British Council dedicated a large part of her 25-year career to promoting community Kenya, where she leads work on education, innovation, voice and accountability, improving access to opportunities for women entrepreneurship, and science. Before moving to Kenya, she was and young people, and fostering stronger linkages between research, Director of Programmes at the UK's Disasters Emergency Committee policy, and practice. and Director of the Ethiopia-Canada Cooperation Office. Monica has



# **PROF. ANDALA DICKSON**

Prof. Dickson Andala is a distinguished academic and researcher in the field of Materials Chemistry. He currently serves as an Associate Professor at the Multimedia University of Kenya and is the Chief Executive Officer of the National Research Fund (NRF) in Kenya.

Prof. Andala obtained his Doctorate in Inorganic/Material Chemistry from the State University of New York at Binghamton. He furthered his research experience with a postdoctoral fellowship at Pennsylvania State University. Prof. Andala has an extensive career in academia and research. At Multimedia University of Kenya, he is not only a Senior Lecturer but also the Attachment Coordinator, responsible for guiding students through their industrial attachments.

In addition to his academic role, Prof. Andala has significantly contributed to shaping science, technology, and innovation (STI) policy and strategy in Kenya and Africa. He is an affiliate of the African Academy of Sciences (AAS), a member of the Kenya National Academy of Sciences, and serves on the board of the Kenya Nuclear Regulatory Authority. Furthermore, he holds leadership positions in various scientific organizations, including

being a regional director of the African Materials Research Society and president of the Africa Crystallography Association.

As the CEO of NRF, Prof. Andala oversees the strategic direction and operational management of the fund, which is crucial for promoting research and innovation in Kenya. NRF supports research initiatives aimed at addressing national priorities and improving the STEM fields through resource mobilization, capacity building, and funding research projects. Under his leadership, NRF has focused on enhancing university-industry linkages, promoting innovation hubs, and supporting impact-based research. Prof. Andala emphasizes the importance of leveraging partnerships with universities and industries to create sustainable employment opportunities and improve the quality of higher education in Kenya.

Prof. Dickson Andala's extensive experience and leadership in the fields of materials chemistry and research funding make him a pivotal figure in advancing scientific research and innovation in Kenya.

#### **DR. MUGAMBI MWIRIGI**

Commissioner, Kenya School of Revenue Administration (KESRA) Kenya Revenue Authority (KRA)

Dr. Mugambi Mwirigi is the Commissioner of Kenya School of Revenue Administration (KESRA) which is the training School of the Kenya Revenue Authority (KRA). Previously he was the Deputy Commissioner in charge of Academics and Students Affairs since April 2016. He holds a PhD. in Entrepreneurship, a Master of Science . degree in Entrepreneurship, a Bachelor of Business Administration (1st class honors) degree and a Diploma in Small Enterprise Management attained from Galilee International Management College, Israel. He is also a graduate of the Advanced Management Program from Strathmore University. Dr. Mugambi has also been trained in various areas in South Africa, China and Bangladesh.

Dr. Mugambi has published three books namely Leadership Beyond the Boardroom, Journeying to the Horizon and Teardrops from My Heart, one book



chapter and more than 30 research papers in refereed journals. He has also supervised over 15 PhD and many Master's students to graduation.

Dr. Mugambi sits in various boards and committees. He currently sits on the African Tax Administration Forum (ATAF), Advisory Board of the African Tax Research Network (ATRN). He has in the past served as the chairman of the Board Recruitment Committee for the Technical and Vocational Education and Training Authority (TVETA) under the Ministry of Education. Dr. Mugambi is also a member of Rotary International where he is involved in various philanthropic activities

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# **DR. JOSEPH ORERO**

Dr. Joseph Onderi Orero is a Senior Lecturer specializing in Artificial Intelligence at the School of Computing and Engineering Sciences, Strathmore University. He served as the Dean of the school from January 2014 to December 2020, following his role as the Associate Dean of the Faculty of Information Technology.

Dr. Orero earned his PhD in Computer Science (Artificial Intelligence) from the University of Sorbonne, France, in 2011. He graduated with First Class Honors in Bachelor of Science in Computer Science from

Jomo Kenyatta University of Agriculture and Technology, Kenya, and holds a Master of Science in Information Technology Management from Sunderland University, UK. He is an alumnus of Man'gu High School.

His research focuses on intelligent systems and machine learning, particularly fuzzy logic and affective computing. He is dedicated to the development of intelligent health applications and has coauthored numerous peer-reviewed research publications in these areas.



# DR. CHRISTOPHER ODINDO

Chris is a seasoned academic with extensive experience in business, writing, and consultancy. His career began in the financial services industry in Kenya before he was transferred to New York and subsequently to Fenchurch Street in London. Chris was awarded a scholarship to pursue an MBA and later collaborated on a joint Harvard-MIT project in Boston, focusing on technology commercialization strategies. After that, he returned to England to undertake a fully funded PhD, where his thesis explored the competitive and innovative implications of social and technological spaces.

Throughout his career, Chris has worked on a range of consulting projects and reports that have influenced decision-making within leading blue-chip organizations in the City of London, including HSBC, AVIVA, Scottish Widows, the Royal Bank of Scotland, and Barclays. His work has also informed consumer and campaign groups such as the Citizens Advice Bureau, the Personal Finance Education Group, Which?, the Campaign for Community Banking Services, the Consumer Credit Counselling Service, and the Joseph Rowntree Foundation. Additionally, Chris has engaged with policymakers to help inform policy including at the HM Treasury, the Department of Work and Pensions, the UK's financial regulator, and the Financial Ombudsman Service, as well as lawmakers in both the UK House of Commons and the House of Lords.

In recent years, Chris has shifted his focus toward higher education policy, strategy, and practice, concentrating on quality assurance, curriculum development, student engagement, and innovative pedagogical approaches in the age of AI. This shift has led to his regular involvement in contributing to the UK's national policies and reports by several bodies, including The Quality Assurance Agency, Advance HE, and the UK government's AI taskforce.

Chris's pedagogical focus and passion lie in authentic assessments, innovative entrepreneurial mindsets, and emergent technologies like generative AI. He has recently secured funding to develop what he terms the "AI Enhanced Adaptive Pedagogical Model and Tool," which is currently being considered for commercialization as a university spin-out. Chris is also working on another pedagogical model: The Generative Knowledge Advancement Model.

As an entrepreneur, Chris has founded and successfully exited multiple companies, including the first SAAS white label online insurance and rating software in the East African region. He is also a public speaker, currently conducting a public lecture series on technology and innovation, and how universities need to rethink their value proposition, including by 'thinking Al'. Generative Al is of particular interest to him given its implications for innovation and transformation.



# **PROF. DOLORES O'RIRDAN**

Dolores O'Riordan completed a PhD in Protein Chemistry and following some time as a research fellow at UCC and Cornell University, Ithaca, New York she moved to research in the industrial food sector. She had 6 years international industrial research and development experience in the area of food ingredients, as an employee of Kerry Ingredients, Plc. She developed and promoted the sale of innovative milk ingredients for the Irish, UK, mainland Europe, North and South American markets. She joined the Food Science team at UCD in 1995. Since then, she has secured substantial funding from competitively won grants to conduct research in the area of food ingredients/health inducing food ingredients. There was an industrial contribution to most of the research grants reflecting the value of research to the food industry and the commercial potential of the output. She established a critical mass and an internationally recognized research team in health inducing foods as evidenced by invitations to chair and give presentations at international conferences; external evaluator of grant proposals; membership of Advisory Bodies and the development of international collaborations with leading institutes in the discipline of Food Science. Her research has led to several collaborations with Irish, North American and European Universities. A very important aspect of her work is collaboration with the food Industry. Her expertise in the areas of physical and chemical analysis of foods and food formulation technology underpins her research. Her current research focuses on enhancing the functionality and health benefits of food ingredients with a focus on food structure and digestibility. She is the Director of UCD's Institute of Food and Health. She is also UCD's Vice-President for Global Engagement.



# **PROF. JOHN K CHANG'ACH**

John Chang'ach is a Professor of History at Moi University with over 18 years of experience in teaching, research, and consultancy, specializing in postgraduate supervision. He has led numerous research collaborations, including serving as the former Project Leader of CERM-ESA (2017-2022). John has completed several professional development courses, such as the Strengthening Postgraduate Supervision course (August-November 2022) awarded by African Excellence, Digital Initiative for African Centres of Excellence (DIGI-FACE), and online training for supervisors of Doctoral candidates at African Universities offered by the Centre for Research and Evaluation, Science and Technology CREST (September-December 2021). He has attended the CREST Alumni Networking meeting at Stellenbosch University, Cape Town, South Africa on Research & Capacity Building in Doctoral Supervision at African Universities, where he presented a paper and served as a discussant and co-facilitator. Currently, John serves as the acting Deputy Vice-Chancellor of Academic, Research, and Student Affairs (ARSA) at Alupe University, contributing significantly to university research and innovation.



# **PEDRO CERDAN-INFANTES**

Program Leader, Human Development in the Kenya, Rwanda, Somalia

Pedro Cerdan-Infantes is the Program Leader for World Bank Human Development in the Kenya, Rwanda, Somalia, and Uganda Country Management Unit (CMU) based in Nairobi, Kenya.

#### PROF. WASHINGTON OCHIENG, EBS, FRENG

#### Head of Department of Civil and Environmental Engineering, Department of Civil and Environmental Engineering - Faculty of Engineering



Professor Washington Yotto Ochieng, EBS, FREng, is the current Head of the Department of Civil and Environmental Engineering, and Chair Professor in Positioning and Navigation Systems. He is also the Interim Director of the Institute for Security Science and Technology (ISST) at Imperial College London. Formerly, he was Head of the Centre for Transport Studies, and Senior Security Science Fellow and Co-Director of the ISST at Imperial.

#### **DR. ELIZABETH JOHNSON**

**Provost - American Public University System (APUS)** 



Prior to joining APUS, Dr. Johnson was the Provost at Post University in Waterbury, CT, applying her passion for the design and delivery of high-quality, career-focused education offered to Post's 1,000 main campus students and 20,000 online students. Elizabeth led the Academic Affairs strategy in Post's five schools and within the student support services. In her 6 years as Provost, she implemented 8 new academic programs, earned two programmatic accreditations, and added two new Schools (American Sentinel College of Nursing and Health Sciences and School for Continuing Education). Elizabeth prioritizes academic integrity, workforce readiness, and DEI values in every Academic Affairs initiative. Prior to being named Post's Provost in 2016, Elizabeth was an Assistant Professor of Environmental Science, Director of Science Programs, Dean for the School of Art & Sciences, and Assistant Provost.



# PHILIPP ASSMUS

#### **CEO & Founder of TheFactor-Y and CBaaS**

Introducing CBaaS: Market your patents and innovations risk-free with TheFactor-Y's CBaaS.

Philipp Assmus is the main source of ideas and vision for TheFactor-Y's strategic orientation. He has extensive experience directing companies in the financial and credit services sector and international consulting firms. With degrees in banking and economics, Philipp brings 15 years of entrepreneurial expertise, navigating all the ups and downs of the business world.

# **ANDRE VARMA**

#### Partner/Business Development Director Introducing how you can join the CBaaS program risk-free.



With over 30 years of experience, Andre Varma is a global company builder, excelling in guiding startups to scale-ups. An expert in due diligence for Venture Capital, he recently led a European consortium in automotive blockchain logistics.

# **DR. LAWRENCE NDERU**

Chairman, Department of Computing, Jomo Kenyatta University of Agriculture and Technology Founder JHUB Africa



Dr. Lawrence Nderu is a prominent academic and researcher specializing in Computer Science, with a focus on Artificial Intelligence (AI) and Machine Learning (ML). He currently serves as a Lecturer and Research Fellow in the Department of Computing at Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Kenya. Additionally, Dr. Nderu is a Senior Instructor at JENGA School of Data Science and AI and an Adjunct Professor at the Pan African University Institute for Basic Sciences, Technology, and Innovation (PAUSTI).

Dr. Nderu holds a Ph.D. in Computer Science with a specialization in Artificial Intelligence and Fuzzy Logic from the University of Paris 8 Vincennes-Saint-Denis, France. He also earned a Master's degree in Software Engineering and a Bachelor's degree in Mathematics and Computer Science, both from JKUAT.

Throughout his career, Dr. Nderu has demonstrated a robust commitment to advancing AI and ML applications in various fields, including health, agriculture, and natural language processing. His research has been widely published in peer-reviewed journals, and he is a frequent presenter at international conferences.

In addition to his academic roles, Dr. Nderu is the founder of JHUB Africa, an innovation hub within JKUAT, and the co-founder of the Global Digital Innovation Hub (gDIH) in Konza City, Nairobi. These initiatives aim to foster innovation and technological advancement within Kenya and across Africa.

Dr. Nderu's dedication to education and research is complemented by his significant contributions to software development, with expertise in programming languages such as Python, Java, C#, C++, and R, among others. His work continues to impact the fields of AI, ML, and software engineering, driving forward the integration of these technologies in solving real-world problems.



# **DR. DOROTHY WORDEN**

Dr. Dorothy Worden is an accomplished scholar in Applied Linguistics, focusing on second language (L2) writing teacher cognition, genrebased approaches to academic writing instruction, and sociocultural theory. She currently serves as a faculty member in the Department of English at The University of Alabama, where she has been contributing since 2016.

Dr. Worden's academic journey began with an MA in Composition and Rhetoric from Washington State University in 2008. She then pursued a PhD in Applied Linguistics at Penn State University, completing it in 2015. Her research is heavily influenced by her experiences in teaching and tutoring writing, which ignited her interest in understanding and improving the pedagogical methods of L2 writing instructors.

Her research interests include examining the professional development of novice L2 writing teachers. Dr. Worden's notable publication, "Mediation and development of a novice L2 writing teacher's pedagogical content

knowledge of genre," published in the Journal of English for Academic Purposes, explores the intricate processes involved in L2 writing teacher training and development.

At The University of Alabama, Dr. Worden teaches courses related to her research interests, including L2 writing pedagogy and genre-based approaches to writing instruction. She is also involved in innovative projects such as the Writing Center study, which investigates what tutors learn through their work, and her participation in the Discourse Lab, a collaborative effort with faculty from various disciplines aimed at advancing research in language and communication.

Dr. Worden's contributions to academia extend beyond her research. She actively mentors' pre-service ESL writing teachers, providing them with frameworks to investigate and teach unfamiliar genres, thereby preparing them for the dynamic challenges of their future teaching careers.



# **PROF. ENG. P. N. KIONI**

Professor Kioni, a distinguished scholar and engineering leader, formerly served as the Vice Chancellor of Dedan Kimathi University of Technology (DeKUT) in Nyeri, Kenya. During his tenure, he played a pivotal role in solidifying DeKUT's position as a vanguard of technological innovation in Africa. Professor Kioni's academic foundation is formidable, with a Bachelor's degree in Engineering from the University of Nairobi and a Ph.D. in Engineering from the prestigious University of Cambridge. His early career saw him make significant contributions to both academia and industry, particularly within the realm of mechanical engineering.

Under Professor Kioni's visionary leadership, DeKUT achieved remarkable milestones. A noteworthy accomplishment was the establishment of the DeKUT Science and Technology Park – the first of its kind in Kenya. This park serves as a hub for innovation, fostering value addition in materials, information and communication technologies (ICT), and the application of technology in food production. It has successfully attracted partnerships with local and international organizations.

A crowning achievement during Professor Kioni's tenure was the establishment of a semiconductor manufacturing facility at DeKUT in collaboration with Semiconductor Technologies Limited (STL). This facility, specializing in the production of integrated circuits and nanotechnology products, represents a quantum leap for Kenya's technological prowess. It aspires to meet both domestic and global demands, propelling economic

growth and solidifying Kenya's position as a key player in the global semiconductor industry. Professor Kioni actively championed research and development (R&D) at DeKUT, fostering innovation across diverse fields like renewable energy, advanced materials, and biotechnology. His efforts led to collaborations with esteemed institutions like MIT and Penn State University, significantly enhancing DeKUT's research output and global standing.

Beyond his administrative responsibilities, Prof. Kioni is a staunch advocate for student development and community engagement. He implemented scholarship programs and facilitated numerous opportunities for students to participate in cutting-edge research projects and industry collaborations. His vision emphasizes making higher education accessible and impactful, ensuring a seamless linkage between academic pursuits and real-world applications.

Professor Kioni's remarkable contributions have garnered widespread recognition both within Kenya and internationally. His leadership has not only elevated DeKUT's stature but also significantly contributed to the advancement of Kenya's educational and technological landscape. He continues to be a beacon of inspiration for innovation and excellence in engineering and higher education. Professor Kioni's unwavering dedication to education, research, and technological advancement solidifies his position as a transformative leader in the academic and engineering communities.



#### **DR. JULIUS K. SIND** African Population and Health Research Center (APHRC),

Dr. Julius K. Sindi is a notable figure in the field of social enterprise and public health research in Kenya. He holds a prominent position at the African Population and Health Research Center (APHRC), where his work primarily focuses on scaling up and evaluating social enterprise initiatives. Dr. Sindi's academic and professional journey reflects his deep commitment to public health and community development. Dr. Sindi has an extensive educational background that includes a PhD in Public Health. His academic pursuits and professional roles have always been aligned with his passion for social change and community health.

At APHRC, Dr. Sindi has been instrumental in driving forward projects that aim to improve health outcomes through innovative and scalable solutions. His work involves rigorous monitoring and evaluation to ensure these projects achieve their intended impact. Dr. Sindi has contributed to numerous peer-reviewed publications that delve into various aspects of public health and social enterprise. His research is well-regarded for its depth and practical implications in improving health services and policies in Kenya and beyond.

Beyond his role at APHRC, Dr. Sindi is actively involved in several advisory capacities. He has been a key figure in policy formulation and implementation, often called upon to provide his expertise in public health strategies.

His contributions extend to mentoring young researchers and professionals in the field, fostering a new generation of public health experts who can continue to drive forward the mission of improving health outcomes.

Dr. Sindi's work exemplifies the critical intersection of research, policy, and practice in public health, making significant strides in addressing some of the most pressing health challenges in Kenya.



# **DR. WINSTON OJENGE**

Dr. Winston Ojenge is a distinguished scholar in the field of Computer Science, currently serving as a Senior Research Fellow at the African Centre for Technology Studies (ACTS) in Nairobi, Kenya. He heads the Digital Economy Program at ACTS and is heavily involved in research related to artificial intelligence, machine learning, and the Internet of Things (IoT).

Dr. Ojenge earned his PhD in Computer Science from the Technical University of Kenya in 2018. He also holds a Master of Science in Information Systems from the University of Nairobi and a Bachelor of Science from Moi University. His academic career has included significant contributions to teaching and research. He has lectured on various topics including machine learning, artificial intelligence, automation, and robotics at the Technical University of Kenya.

Beyond his academic roles, Dr. Ojenge is the founder and coordinator of the Innovation Lab at the Technical University of Kenya. He has secured three patents in telecommunications and AI, with three additional patent applications under review. His research work is welldocumented through numerous publications, including contributions to international conferences and journals.
## **PROF. ELIJAH SONGOK**



Prof. Elijah Martim Songok is a distinguished virologist with over 26 years of experience in research and training, particularly focusing on HIV/AIDS, Hepatitis, and emerging viral infections. He serves as the Director General of the Kenya Medical Research Institute (KEMRI) and is also associated with the Kenya BioVax Institute. Prof. Songok obtained his BSc and MSc degrees in Biochemistry from the University of Nairobi. He then pursued a PhD in Viral Infections from Kanazawa University in Japan and completed a postdoctoral fellowship at the University of Manitoba in Canada. His academic career includes positions as a professor at Kanazawa University and the University of Manitoba.

Throughout his career, Prof. Songok has been actively involved in numerous roles and committees. He has headed the KEMRI Infectious and Parasitic Diseases Research Program, chaired the Kenya World Hepatitis Day Commemoration Committee, and served as a technical expert for developing Kenya's national guidelines for the diagnosis, treatment, and prevention of viral hepatitis. He is also a member of the WHO-UNAIDS network for HIV isolation and characterization and the Kenya Advisory Committee for Blood Safety and Availability.

Prof. Songok has published over 50 articles in peer-reviewed journals and has secured more than twenty international research grants and awards. His work has been supported by prestigious organizations, including the Bill and Melinda Gates Foundation, Japan International Cooperation Agency (JICA), Canadian Institutes of Health Research (CIHR), International Development Research Centre (IDRC), Third World Academy of Sciences, and the Toyota Foundation. At KEMRI, Prof. Songok has spearheaded significant advancements, including the establishment of a state-of-the-art Stem Cell and Regenerative Medicine laboratory, the first of its kind in Sub-Saharan Africa. This facility aims to address the rising tide of non-communicable diseases in the region by developing new therapies to regenerate and repair tissues affected by diseases or injuries.



## JPR OCHIENG' ODERO PHD HSC MKNAS

Dr J. P. (JPR) Ochieng'-Odero is a scientist with a keen interest in the place of science, technology, and innovation (ST&I) in economic development, and the role of learning, knowledge sharing, and mentoring in capacity strengthening, especially in the Global South and particularly in Africa.

Has a BSc. (Zoology) from the University of Pune and earned a Ph.D. in Zoology (specializing in Entomology) from the University of Auckland, New Zealand in 1989. Has been a consulting Team Leader of the FCDOfunded Research and Innovation Systems for Africa (RISA)

Has been Project Team Leader of the FCDO-funded East Africa Research Fund (EARF), was Deputy Director & Head of Scientific Programmes of the Consortium for National Health Research, and a Senior Research Scientist, Head of the capacity strengthening programme of the International Centre of Insect Physiology and Ecology.

He was mentored by the late Prof. Thomas R. Odhiambo at the R&D Forum for Science -led Development in Africa (RANDFORUM)which organized regional S&T Roundtables and policy-oriented Summits.

JPR did consultancy work on the commercialization of research outputs through science parks and was a resource person to the first and second Copenhagen Series of Seminars on Conditions for Social Progress. JPR was/is

• Appointed (2015-2021) member of the Board of Trustees of the

National Research Fund (NRF)

- Appointed (2013-2017) to the Commission of University Education (CUE)
- Member of the Kenya National Academy of Sciences (KNAS, March 2021).
- Member of the African Scientific Advisory Board (ASAB) of The African Academy of Sciences (AAS) (March-Current, 2019).
- Consultant to the World Bank to develop a research strategy for the Regional Scholarship and Innovation Fund for Applied Sciences, Engineering and Technology (PASET-RSIF).
- Member of the Programme Monitoring Committee of the Regional Integration Research Network of the Common Market for Eastern and Southern Africa (COMESA).
- Consultant to the Centre for Agriculture and Biosciences International (CABI) to develop a national Desert Locust Management Strategy for Kenya.

JPR published several articles on scientific research, capacity building and technology policy. He has a passion for theatre and is a published playwright and director. For his various contributions to national development, he was awarded a Head of State Commendation (HSC), Kenya in 2013.



## **MR. NUNO FERNANDES**

Nuno Fernandes is the fifth President of APUS, a role he has held since Sept. 1, 2022. He is a visionary leader who has been successful in making online higher education more affordable and accessible, while focused on delivering high-quality education and favorable student outcomes.

Mr. Fernandes brings to APUS a wealth of experience across higher education, technology and business, most recently as serving president and CEO of Ilumno, the largest online program manager in Latin America and among the Top 3 globally (in the number of managed students). Over the course of 10 years, he held several executive roles with increasing responsibilities and helped to triple the number of students served by the company (over 300,000 students at its peak, up from 100,000 students when he joined).

During Mr. Fernandes's tenure at Ilumno, he was instrumental in the improvement of student retention, student satisfaction, graduation rates and brand reputation at the company's owned and partner universities. At the same time, he led the company focus of expanding access to quality and affordable online and on-ground higher education in

several countries including Colombia, Argentina, Chile, Paraguay, Costa Rica, Panama, and El Salvador, where its former and current partner institutions have become the dominant online market players.

Previously, Mr. Fernandes was managing director of Miami-based Overseas Leisure Group, an award-winning luxury tourism provider that serves 2,000 travel agencies and tour operators globally. Prior to that, he was vice president of marketing and product management for the Thermo-Technology division of Bosch in the United States. Over the course of 11 years at Bosch Group, he served in various roles across product management, marketing, and sales in multiple countries, including Portugal, Spain, Germany, Brazil, Mexico and United States.

Born in Porto, Portugal, Mr. Fernandes holds a Master of Business Administration from the W.P. Carey School of Business at Arizona State University, and a Bachelor's Degree in Economics from the University of Porto. He has also participated in several executive education programs at Harvard Business School and Carnegie Mellon University, among others.

Mr. Fernandes is trilingual, speaking English, Spanish and Portuguese



## **PROFESSOR IZRAEL DA SILVA**

Prof. Da Silva has a PhD in Power Systems Engineering from the University of Sao Paulo (Brazil). He is also a Certified Energy Manager (CEM).

Presently, he is a Professor at Strathmore University and the Deputy Vice Chancellor – Research and Innovation. He is the founding member of the Strathmore Energy Research Centre, SERC. The Centre carries out training, research, testing and consultancy in energy-related topics. His topics of interest are: Rural Electrification, Renewable Energy, Energy Efficiency, Energy Policy, Sustainable Environment and Demand Side Management.

Prof. Da Silva was appointed UNESCO chair on climate change mitigation and sustainability, which will help to achieve impact on the global platform. He is also the current chair of the board of directors of KCIC (Kenya Climate Innovation Centre). Professor Izael Pereira Da Silva is a renewable energy specialist with over 20 years of experience in research and academic leadership. He is a Professor and Deputy Vice-Chancellor for Research and Innovation at Strathmore University where he also spearheads the UNESCO/UNITWIN chair on climate change resilience and sustainability. He holds a Bachelor of Science (BSc) in Electrical Engineering, with a specialization in Power Systems and Telecommunications, from the Federal University of Parana.

A qualified engineer, he is a member of several engineering societies within and outside Africa such as the Council of Engineers in Energy Transition (CEET). He is also an Accredited Energy Auditor with Kenya's Energy and Petroleum Regulatory Authority (EPRA), and a Certified Energy Manager with the Association of Energy Engineers (AEE), based in Atlanta, Georgia. Over the years, he has worked with government ministries, development agencies (like GIZ, Sida, the World Bank, etc.) and industry

stakeholders (within and outside Africa) in research and research-related projects, to deepen the linkage between industry and academia.

Outside work, he is a long-distance runner and fitness enthusiast, having participated in the Standard Chartered Nairobi marathon from 2011 to 2017 and the Ndakaini Half marathon in 2016. He also enjoys hiking. So far, he has climbed Mt. Kilimanjaro and Mt. Kenya



### **PROF. WALTER O. OYAWA**

Director General National Commission for Science, Technology & Innovation (NACOSTI),

Prof. Walter O. Oyawa, is currently the Director General of the National Commission for Science, Technology & Innovation (NACOSTI), and the Chairman of the East African Science and Technology Commission (EASTECO), which was established as a semi-autonomous institution of the East African Community.

He is a member of several international and national Governing Boards of institutions/corporations that include; The International Science Council (ISC), the International Centre for Genetic Engineering and Biotechnology (ICGEB) Board, the Joint UK-Kenya Oversight Board, Kenya National Innovation Agency (KENIA) Board, the Kenya Medical Research Institute (KEMRI) Board, and the National Research Fund (NRF) Board, among others. At academic/professional level, Prof. Oyawa is a Full Professor of Civil (Structural) Engineering, and a holder of a PhD in Civil Engineering, MSc in Civil Engineering, BSc in Civil Engineering, and Executive MBA, amongst others. He is a Registered Professional Engineer, and a Lead Expert on Environmental Management-NEMA.

In addition to his current position as Director General of NACOSTI, Prof. Oyawa has served in various senior leadership/management positions including having been the first substantive Principal/CEO of Multimedia University College-Kenya. He has also served as the Deputy Commission Secretary/ CEO (Administration & Finance) at the Commission for University Education (CUE), the first Ag. Principal of the pioneering College of Engineering & Technology (COETEC) at JKUAT, the first Director of SMARTEC-JKUAT (a Research & Technology Centre for Sustainable Construction Materials), the Chairman of Management Board of SMARTEC-JKUAT, and the Chairman of Civil, Construction & Environmental Engineering Dept.-JKUAT, among others. Prof. Oyawa is a holder of several other Certificates that include; Strategic Leadership Development Program, Corporate Governance for Directors, Project Management, and Financial Management.

He has vast experience in research/scholarly work, as evidenced by extensive publications and presentations in peer reviewed journals, conferences, reports, and lead presentations. He has been a convenor of conferences, a keynote speaker, and a reviewer for several international journals, as well as being an engineering consultant on several projects. He has supervised a large number of PhD and Master's degree students. His core area of research embraces Sustainable Construction Materials and Technologies.



## **PROF. MARGARET HUTCHINSON**

### **Professor of Horticulture**

Prof. Margaret Jesang Hutchinson is a Horticulturalist and Senior Lecturer at the University of Nairobi with over 30 years' experience in the agriculture sector. She obtained her PhD in Horticulture from the University of Guelph in Canada and MSc. in Agronomy and BSc. Agriculture from the University of Nairobi.

Her research and outreach work cover most areas of Horticulture and more so Floriculture, from policy to programming and the entire value chain of several commodities. Some of these include: Development of tissue culture protocols for several economically important floriculture and fruit crops; optimizing the agronomic and pest control practices of fruits, vegetables and flower crops, reducing postharvest loses of horticultural crops (cut-flowers, fruits and vegetables); gender mainstreaming in policy and programming just to name a few.

Prof. Hutchinson has published widely in refereed journals and conferences.



### **PROF. MAURICE ODUOR OKOTH** Professor of Chemistry, University of Eldoret (UoE)

Prof. Okoth holds a Bachelor of Science (B.Sc.) degree in Chemistry from Moi University, Kenya and a Masters of Philosophy (MPhil) and a Doctor of Philosophy (PhD) degrees in Physical Chemistry from University of Strathclyde, UK. He has taught and supervised at university level for over 34 years. His areas of interest and research include but not limited to Crystallization, Polymorphism, Molecular structure elucidation, Structure-property studies and thermal decomposition kinetics of organic compounds, Synthesis of Bioinorganic compounds and Contaminants of Emerging Concern in pollution of water. He has written proposals that have been funded.

Prof. Okoth has served as a University Timetabler; an Academic programme leader, Assistant Registrar (Examinations), a University Council member, Director, Quality Assurance, a Deputy Vice-Chancellor (Academic Affairs) and a Vice-Chancellor. He also served as the chairman of the Executive Committee of the Inter-University Council for East Africa (IUCEA) during his term as VC.

Prof. Okoth was trained as part of the 3rd Cohort of Quality Assurance champions in East Africa region courtesy of a collaboration between IUCEA, German Academic Exchange Service (DAAD), Higher Education Management (DIES) and German Rectors' Conference (HRK). He has a wealth of experience in Quality Assurance, Curricula Development and Implementation, Academic programme assessment, ISO 9001 Quality Management Systems, Monitoring & Evaluation, Institutional fundraising and governance. He is also a proficient University Manager.

Prof. Okoth was the founding president of Commonwealth Scholarships Alumni Association of Kenya (CSAAK), the founding patron of Association Academic Registrars of Universities in Kenya (AARUK), the immediate former Vice Chairman of the East African Higher Education Quality Assurance Network (EAQAN) and the Deputy Chairperson of the Kenya Universities Quality Assurance Network (KuQAn) Board of Management and currently serving as a Professor of Chemistry at the University of Eldoret (UoE) in Kenya

# **ABSTRACTS**

**COMMISSION FOR UNIVERSITY EDUCATION .43** 

## TRACK 1: PREPARING GRADUATES FOR THE WORKFORCE OF TOMORROW

44. COMMISSION FOR UNIVERSITY EDUCAT

## **T1.1:** BRIDGING THE GAP: ALIGNING CUE GUIDELINES WITH COMPETENCY-BASED EDUCATION IN POSTGRADUATE CURRICULA DEVELOPMENT

Dr. Samson Ikinya Kariuki -kariuki.samson@ku.ac.ke Dr. Hellen Kiende Guantai -kiende.hellen@ku.ac.ke

### Abstract

Competency Based Education and Training (CBET) is a reality at the higher institutions of learning. It is expected that students are exposed to both performance and knowledge-based competences to enhance their employability. The purpose of this study was to analyze the Commission of higher education guideline of January 2024 in supporting the universities to develop and review postgraduate program. The study explored the extent to which CUE curriculum development guideline is aligned to the principles of developing competency-based education and training curricula for postgraduate level.

The study was anchored on functional job analysis approach in curriculum development. Data collection methods involved document analysis, participation in curriculum development processes and interviewing university curriculum developers. The data analysis method involved a systematic process of evaluating the CUE guidelines of curriculum development against principles of developing competency based curriculum as prescribed in the Competency Based Education and Training framework 2018, International Labour Organization (ILO) model Competency Standards and Competency standards for the

Association of Southeast Asian Countries (ASEAN) region. The study established a gap between CUE guideline for developing curricula and the principles of developing CBET curricula.

The paper recommends reviewing the CUE guidelines to incorporate a systematic process that advocates for involvement of enterprises in the design and development of the curriculum and the training materials, developing a detailed task analysis procedure for each course program. The paper further recommends development of performance criteria statements and assessment tools. The impact of implementing the recommendations may result into developing a competence based curricular that addresses the needs of the labour market hence promoting the tripartite engagement between labour market, training institution and trainers. This will ensure that the training program aligns with the industry needs and effectively prepares individuals for the workforce.

### Key words

Functional job analysis, CUE guidelines performance criteria and task analysis

## **T1.2:** INTEGRATION OF LIFELONG LEARNING AND INDUSTRY PARTNERSHIP FOR GRADUATE TEACHER EMPLOYABILITY IN KENYA: ADDIE MODEL APPROACH.

Ochieng, Pamela A (Ph.D.)

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### Abstract

The pivotal role of the teaching practice exercise lies in shaping the professional journey of aspiring teachers, influenced by the interactions among university supervisors, host teachers, and the aspirants themselves. In Kenya, as in many parts of the world, unemployment, particularly among the youth, poses a significant challenge, with the education sector feeling its impact acutely. Amidst this backdrop, this study delves into the mechanisms of lifelong learning within Kenyan teacher education programs and examines the crucial role of industry partnerships in enhancing graduate teacher employability. Employing the Theory of Change framework, the study aims to elucidate these aspects and proposes a comprehensive framework for the review of teacher education programs, leveraging the ADDIE model. Drawing from a descriptive survey design across two public and two private universities, the findings underscore the catalytic role of policy and organizational structures in fostering lifelong learning and industry

collaborations. The study advocates for the promotion of job-skill alignment to mitigate structural unemployment, emphasizing the importance of sustainable stakeholder relationships and skill anticipation mechanisms. It concludes by highlighting the imperative for systemic and administrative reforms in teacher policy to ensure a robust supply of qualified educators tailored to meet the demands of the evolving educational landscape. This research carries significant implications for educators, policymakers, and stakeholders invested in enhancing graduate teacher employability and fostering sustainable partnerships between academia and industry.

*Key words*: Community Service Learning, Industry Partnership, Graduate Teacher Employability

## **11.3:** ANALYZING THE EFFECT OF TECHNOLOGICAL INNOVATION ON EMPLOYMENT PATTERN IN KENYA

FAITH WANJA KILAKU1 DR. J. NTHIIRI2 MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

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### Abstract

Technological innovation presents prospects to transcend traditional development pathways and significantly improve socio-economic conditions in the African setting, particularly Kenya. However, the advantages of technological innovation have not been equally spread throughout Africa, which has created obstacles for inclusive growth and exacerbated already-existing inequalities. Regional programs like Agenda 2063 of the African Union emphasize how crucial it is to use technology to promote sustainable development and employment creation. Similarly, the introduction of technology into Kenya's economy has also sparked concerns about how it may affect unorganized labour, traditional industries, and economic inequality. To drive evidence-based policy actions and promote equitable and sustainable development, this study focused on analysing the effect of technological innovations on employment pattern in Kenya, using time series data from 2001 to 2022. Unemployment was adopted as the moderating variable to examine its potential in influencing the relationship. The study considered internet usage rate on digital platforms, mobile internet access and automation innovations in technological field. In review of

literature structural transformational theory was used as anchoring theory. The study adopted correlational and regression econometric models for analysis. The researcher used E-views 10 software for data analysis. Several diagnostic tests were also carried out before and after regression analyses to confirm the characteristics of the variables understudy. From the findings of the study, correlational analysis revealed that technological innovation had a positive significant relationship with employment patterns, (0.627, pv<0.05). Stationarity test revealed that technological innovations was stationary at first difference while employment patterns and unemployment (M) were found to be stationery at second difference. The regression analyses results revealed R-squared of 0.40 and 0.0023 significance level. After the introduction of unemployment as a moderator the goodness of fit boosted to 0.9891 and prob statistics of 0.000. From this positive nexus, the study recommends that the government of Kenya should invest in skill development and education. The Kenyan government ought to place a high priority on funding programs for education and skill development, considering the considerable impact that

technological advancements have had on work trends. Similarly, the government should invest in vocational training programs, promoting lifelong learning initiatives, and incentivizing educational institutions to offer courses aligned with emerging technologies. Government decision makers ought to bridge the digital divide and promote other digital inclusion initiatives by expanding access to affordable internet connectivity, digital infrastructure, and technology-enabled services in underserved areas. Government authorities in Kenya should implement policies to ensure universal access to affordable and reliable broadband internet infrastructure, especially in rural and underserved areas. This includes expanding network coverage, reducing internet costs, and promoting competition among service providers.

*Key words: Technological Innovations; Employment Patterns; Social Transformation; Labour Market Dynamics* 

## **T1.4:** MENTAL HEALTH CONVERSATIONS WITH STUDENTS: THE PLACE OF 21ST CENTURY SKIILS AMONG UNIVERSITY STUDENTS TODAY

Margaret Njeri Ngugi<sup>1</sup> and Jasper Edward Nyaura<sup>2</sup>

1 ALUPE UNIVERSITY

### Abstract

Mental health is vital topic especially in the busy world today. It entails the well-being of the mind since a healthy mind leads to a healthy life. People with mental health conditions ranging from depression, anxiety, mood disorders etc. face stigmatization and discrimination in the educational institutions, health care and employment (Karim 2004). In Universities today, many students suffer from mental health issues owing to a number of issues such as high expectations from parents and guardians, internal pressure to make it in life considering they have managed to go to University, pressure from uneducated peers who have succeeded as well as pressure from social media where many people tend to display lavish lifestyle without seeming to break sweat. Students usually report to the Universities with high expectations but some lose the hope along the way either because they do not get the right mentors or because they succumb to peer pressure. The purpose of this paper then is to find out how the 21st century skills can help the students be resilient while learning as well as in the job market., how to create safe spaces for the them and how they can be responsible, productive, buoyant, strong willed and take initiative in life despite the curve balls

that life throws at them. These 21st century skills include but not limited to communication, collaboration, creativity, critical thinking, problem solving, leadership, innovation, life skills among others. Over the last several decades, the world saw a period of profound change in every aspect of life, including technology, society, global trade and economy, and education. The Covid-19 pandemic recently raised additional issues that people had to cope with. In these situations, it is critical for people to have a diverse skill set so they can successfully navigate the challenges of real life (Lamri, 2019). These skills are particularly important as they help University students know how to navigate life challenges and how to cope successfully despite many hurdles in front of them. A study by Ghafar (2020) on connection between entrepreneurship and 21st century skills, revealed that students love it when they are involved in studies, are allowed to be innovative, lecturers communicate well to them and where they are allowed to solves issues creatively. This could be extended to this study to mean where students are allowed to communicate and collaborate freely, then high productivity is likely to be achieved leading to mental well-being. The objectives of the study are to Investigate the

challenges facing the students in Universities today, to find out how the 21st Century skills can alleviate these challenges and to synthesize the level of awareness of 21st Century Skills to mental health well-being. The study will be conducted in Universities in Kenya and in depth interviews will be conducted to shed more light on the study. The research methodology used will be Qualitative in nature so as to understand the University students' in depth attitudes and perception of the 21st

century skills in a society where mental health issues are on the rise. The data will be analyzed thematically and the expected findings will help in adding theoretical knowledge to the body of studies on mental health well as aid in shaping policies pertaining education in institutions of Higher learning.

Key words: 21st Century Skills, Mental health, Knowledge

## **T1.5:** THE ROLE OF UNIVERSITIES IN PREPARING GRADUATES FOR THE WORLD OF WORK: THE CASE OF A PRIVATE UNIVERSITY IN KENYA

Dr. Joab Namai

**Daystar University** 

### Abstract

'The main problem today is not about employment, but employability' This comment was made by one of the eminent professors in Kenya while addressing a group of students as they prepared for their graduation ceremony. Indeed, employability skills are very critical in job placement for fresh graduates across all institutions of learning. They must have higher levels of competency, and continuously develop themselves in order to become more competitive. This is mostly based on the level of preparation received at the institutions of higher learning. Employability skills are known by various terms, including core skills, key skills, common skills, key competencies, generic skills, basic skills, necessary skills, workplace knowhow, transferable skills, critical enabling skills, core work skills, and soft skills. They enable individuals to secure suitable employment while simultaneously developing their careers during social and technological changes. Exposing graduates to employability skills ensure that industries receive competent workers who meet their needs, thus creating an efficient and enjoyable work environment. Although many universities are currently making efforts to develop work skills among their graduates so that they can align with the competencies required by industries, there are still a few complaints from employers regarding the mismatch in preparation of graduates for the job market. This paper focuses on providing a thorough

overview of the current practices in a Kenyan private university aimed at improving future employability skills of students. This is a praxis-based paper focused on analyzing a previous tracer study to establish the training and employability gaps in university graduates. It is assumed that results from this paper will provide a basis for recommendations across institutions of higher learning in order to guarantee graduates with relevant and appropriate skills. This study is based on the theory of Experiential Education. Though prorogated by various philosophers, this paper focusses on the works of David Kolb, who views learning as the process whereby knowledge is created through the transformation of experience. He projects learning in a cycle of four stages namely concrete experience, where the learner has an immediate exposure to a scenario; reflective observation, where the learner comes to terms with what happened; abstract conceptualization, where the learner digests the meaning of what happened; and active experimentation where the learner tries to solve or resolve the situation. To develop employability skills within the university graduates, it is important that they are exposed to these four stages during their learning and training experience

*Key words:* Universities; World of work; Employability Skills; Mismatch; Preparation

## **T1.6:** THE OPEN STATE GRANTS FOR SKILLS DEVELOPMENT IN HIGHER EDUCATION: TOWARDS QUALITY RESEARCH AND INNOVATION FOR COMMUNITY OUTREACH IN KENYA: LESSONS LEARNT FROM DEVELOPED NATIONS

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### Abstract

Kenya has limited state grants supporting research and innovation in higher education. A few of these grants include National Research Fund (NRF), Kenya Education Networks (KENET) and Deutscher Akademischer Austauschdienst (DAAD) Kenya. These grants play a crucial role in advancing research, innovation, and education in Kenya with the aim of contributing to the country's development. However, these state grants are limited to specific areas of research and innovations and skills development. Furthermore, we bring the fact that, our Kenyan universities are experiencing the problems of resource limitations, institutional human resource technical factors and skills gaps. The major challenge is when it comes to securing research funding from the State due to limited financial allocation, hence affecting universities in investing in academic and scientific research. Our universities rely heavily on government allocations which are unpredictable and insufficient in every financial year. Secondly, many of our public universities are crippled with debt burden and funding research and innovation remains

a challenge. Thirdly, with the limited donor support, universities are subjected to competition which is time consuming with rare funding. Moreover, building and managing research capacity in universities requires major funding to attract skilled human resource development and technical equipment of research facilities and centers. There is overreliance on government capitation without diversifying the search for resources through partnerships, contract research, and project proposals outside state funding. Finally, but not the end of these challenges is the state regulatory measures on the above grants that are directly impacting on universities' ability to access funding and sometimes compliance with these regulatory requirements and bureaucratic processes when applying for grants can be cumbersome to researchers in our universities. In addressing these challenges there's need for open states grants towards enhancing research productivity and skills development in our universities. However, there are lessons to be learnt from developed countries where states are funding research in

order to promote skills development and community outreach services. For example, *Horizon Europe funds* from European Union are used within European countries to support research in many thematic areas. Another example is in the United State of America, there is *Increase and Diversify Education Abroad for Students* (IDEAS) grants awarded through the Department of State's Bureau of Educational and Cultural Affairs (CCA) to colleges and universities available from over 28 states to support students and academic researchers. The concept of the Open State grants is the financial award given to researchers, higher institutions by the national government, or federal state to support academic and scientific research projects that contribute to scientific knowledge, technological advancements, social progress and multiple innovations areas of research. Its openness is seen accommodating

limitless research applicants from academic institutions on diversified thematic areas from open interest of individual researchers. The purpose of this paper is to advance critical evaluation of state grants available and by tabling need to set up the open state grants for skills development in higher education in order to enhance quality research and innovation for community empowerment in Kenya. The paper recommends for adoption the lessons learnt from selected developed countries and allocation of funds under the management and administration by respective universities and colleges to facilitate skills development, research, innovations and community outreach.

**Key words:** Open State Grants, Skills Development in Research, Quality Research and Innovations, Community Outreach, Research and National Development and Lessons Learnt from Developed Nations.

## **T1.7: CHARTING THE COURSE: NAVIGATING GOVERNANCE** AND QUALITY ASSURANCE IN PRIVATE AND PUBLIC UNIVERSITIES IN KENYA

### **Maurice Oduor Okoth**

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### Abstract

The landscape of higher education in Kenya is marked by a dynamic interplay between private and public universities, each grappling with distinct challenges in governance and quality assurance. With 79 universities, Kenyan institutions of higher learning needs effective governance coupled with robust quality assurance for success and sustainability. Governance and quality assurance are two pivotal aspects that shape the structure, enhance the decision-making processes, and ultimately improve the educational experiences that these institutions offer.

This research explores the vital role of effective governance and quality assurance in propelling a research-driven and innovative culture within Kenyan universities. It delves into the strategies and practices that enhance academic excellence and drive innovation in both public and private institutions.

Using a mixed-methods approach, data was collected through surveys, interviews, focus groups, document analysis, and observations, providing a comprehensive understanding of the current landscape.

Public universities, tend to employ decentralized governance structures

and comprehensive quality assurance frameworks that ensure rigorous standards and stakeholder engagement. In contrast, private universities, adopt corporate governance principles and innovative quality assurance practices, including international benchmarking and peer reviews. These models highlight best practices that can be adapted for broader application across the higher education sector.

The research findings underscore significant differences between public and private universities in terms of governance flexibility, stakeholder engagement, and resource allocation. Public universities benefit from extensive oversight and robust research infrastructures but face bureaucratic constraints. Private universities excel in agility, financial management, and international collaboration but may have limited stakeholder diversity.

The study offers insights into enhancing governance and quality assurance in Kenyan universities, emphasizing the importance of strategic planning, continuous improvement, and stakeholder involvement to cultivate a dynamic and innovative academic environment.

## TRACK 2: DIGITAL SUPERHIGHWAY AND CREATIVE ECONOMY

**COMMISSION FOR UNIVERSITY EDUCATION .55** 

## **T2.1:** TRANSFORMING UNIVERSITY RESEARCH KNOWLEDGE TO BUSINESS STARTUPS IN KENYA.

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### Abstract.

Research to commercialization (R2C) is a concept that is gaining traction in research institutions as well as Universities in Kenya. In a scenario of reduced exchequer grants and little donor support to these institutions, novel ways are being explored to ensure that alternative revenue streams are generated to support these institutions' activities. Converting research outputs to business startups is a key area that can unlock institutions revenue and hence contribute immensely to solving societal challenges. Universities are at the centre of the knowledge economy and taking into account the wealth of knowledge they generate, there is a need to find out the impact of such knowledge in the country GDP and sustainable development goals. Findings from situational analysis of sampled Universities in Kenya showed critical indicators of readiness of the institutions to jump into the era of commercialization. Such indicators include: institutional policies which includes: Research Policy, the Linkages and Collaborations Policy, the Consultancy Policy and the Intellectual Property Rights Policy with some institutions geared towards commercialization policy; collaborative research projects both locally

and internationally; high number of staffs with PhDs and Masters, high number of publications generated by staff, undergraduate and graduate students; supportive management; student innovation clubs, school (faculty) innovation champions, incubation centres and technology transfer offices. Therefore, expectations are high for Universities to convert such knowledge to intellectual property assets and hence build business startups. This will increase the Universities global competitiveness through high number of intellectual property rights assets and contribute to country economic growth, creating more job opportunities, and contribute immensely to sustainable development goals. The study recommends increased efforts to sensitize staff and students on commercialization and intellectual property rights (IPR) to be able to move beyond the publications and conference presentation stages and commercialize their research outputs/results.

*Key words: innovation, research outputs, commercialization, intellectual property rights* 

## **12.2:** MAPPING LONGITUDINAL MENTAL HEALTH DATASETS TO OMOP COMMON DATA MODEL USING OHDSI: A PHQ-9, GAD-7, AND PSQ APPROACH FROM INSPIRE NETWORK DATAHUB

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### Abstract

**Background:** The burden of mental health disorders in the African context underscores the urgency for innovative data management and analysis strategies (Osborn et al., 2022). The INSPIRE Network Datahub initiative targets the complexities of mental health research by longitudinally tracking disorders such as anxiety, depression, and psychosis. A significant gap identified in existing Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) frameworks is the absence of dedicated vocabularies for psychosis-related data (McCullough et al., 2024). This study introduces novel Psychosis Screening Questionnaire (PSQ) vocabularies into the OMOP CDM, aiming to establish a best practice benchmark for mapping psychosis data (Laidlaw et al., 2023). This endeavor is particularly notable for its focus on longitudinal study data, which presents unique mapping challenges not typically encountered in standard data management practices (Salcher-Konrad et al., 2023).

**Methods:** This research combined primary and secondary data from longitudinal studies in East Africa. Data management followed established standards, using a specialized database for extracting, transforming, and loading data, which included population migration over different waves of research. This database captured the evolving nature of the studies and various instruments used. The data was then mapped to the OMOP CDM using advanced tools, enabling comprehensive analysis through the ATLAS platform. This integrative approach ensured robust data handling and facilitated detailed insights.(Wang et al., 2022).



**Results:** The establishment of the staging database and the integration of PSQ vocabularies into the OMOP CDM have created a robust framework for the analysis of longitudinal mental health data. This framework not only facilitates the standardization of psychosis-related data but also enriches the OMOP CDM, enhancing its utility for multifaceted mental

health research. The development and mapping process underscored the complexities of adapting longitudinal data to a model predominantly designed for cross-sectional datasets, necessitating innovative approaches to ensure accurate and meaningful data representation.







Vocabularies					i
concept_vocabulary $\land$	concept_code $\land$	concept_text ^	$\ \ \ $ inspire_concept_id	$\ \ \sim \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	score ^
INSPIRE	Source of Income	Remittences	300000203	300000203	-
INSPIRE	Source of Income	Trade	300000204	300000204	-
INSPIRE	Source of Income	No Income Mentioned	300000205	300000205	-
INSPIRE	Wealth Quintile	Less Poor	300000206	300000206	-
INSPIRE	Wealth Quintile	Poor	300000207	300000207	-
INSPIRE	Wealth Quintile	Poorest	300000208	300000208	-
INSPIRE	Wealth Quintile	Very Poor	300000209	300000209	-
INSPIRE	Wealth Quintile	Least Poor	300000210	300000210	-
INSPIRE	Wealth Quintile	No Answer	300000211	300000211	-

LPS Fact

Individual and Household Demographics





### Rows 55-63 of 212 🔇 🔪

Population Studies and metadata

Concepts

**Discussion/Conclusions:** The introduction of PSQ vocabularies into the OMOP CDM represents a pioneering step towards addressing the underrepresentation of psychosis data in longitudinal mental health research. This work highlights the intricacies of mapping such data within the constraints of existing data models, advocating for a more flexible and comprehensive approach to data management in health research.

The utilization of a staging database in the INSPIRE Network Datahub project represents a ground-breaking approach in the management of longitudinal mental health data. Unlike traditional databases, the staging database does not solely host questionnaire data but serves as a comprehensive descriptor of the longitudinal study at every stage. It provides a unique "window" into the ongoing execution of the protocol, offering unparalleled insight into the nuances of each round or wave of the study. This aspect of the staging database not only facilitates detailed reporting on all ongoing studies but also ensures a standardized format for the source data being integrated into the OMOP Common Data Model (CDM).

This dual-endpoint model, where the staging database and the OMOP CDM serve distinct yet complementary roles, was critical for the success of longitudinal mental health research. The staging database acts as a foundational layer that captures the entirety of the study's execution, which is crucial for maintaining consistency in data mapping and interpretation across various phases of research.



### Depression severity by gender

Mapping data from the staging database to the OMOP CDM is a thorough process, especially in longitudinal studies where data from different rounds/waves must be accurately represented. This included mapping rounds/waves to visit\_occurrences and instruments administered in a study to visit\_details in the OMOP model. Such mappings were essential for preserving the integrity of the data across the research continuum, from data collection to analysis.

Furthermore, the emphasis on a "common" data model underscores the importance of consistency in how instruments like the GAD-7 and PHQ-9, among others, are represented within the OMOP CDM. By treating these instruments as measurements rather than observations and leveraging the LOINC vocabulary for standardized question and answer concepts, the project ensured that data from these tools were consistently and accurately integrated into the broader research framework. This consistency was vital for enabling coherent and reliable analysis across studies, facilitating a deeper understanding of mental health dynamics, and informing effective intervention strategies.

Finally, the successful integration of these vocabularies and the use of the OMOP CDM has facilitated comparative analyses between mental health data and other health datasets, such as those pertaining to HIV, which are already represented within the OMOP framework. This comparative capability is vital for informing policy decisions, contributing to the attainment of SDG goals, particularly those related to health and well-being. By establishing best practices for the mapping of psychosis data in longitudinal studies, this research not only advances the field of mental health data science but also paves the way for more informed, evidence-based policy-making and intervention strategies in the region and beyond.

### Impact of the work on Mental Health in Africa

The current mental health work on building a data science platform in Africa has had a profound impact. By mapping data from staging databases to the OMOP CDM, especially in longitudinal studies, it ensures accurate representation and preservation of data integrity. The use of standardized instruments like the GAD-7 and PHQ-9 as measurements within the OMOP framework allows for consistent and reliable data integration and analysis. This facilitates comparative analyses between mental health data and other health datasets, such as HIV, and informs evidence-based policy-making and intervention strategies, contributing to the attainment of SDG goals related to health and well-being.

## **12.3:** BIO-ALKANOL GEL FUEL AS RENEWABLE ENERGY

(Patent Number, KE/P/2019/3341)

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### Abstract

It is estimated that in Africa, biomass fuels account for more than 90% of primary energy supply regardless of the adverse effects it has on the environment. Bio-Alkanol gel is a thick liquid fuel that is a mixture of alkanol and cellulose. It is derived from sugars in either orange, mango, banana, watermelon or papaya fruit peelings through microbial fermentation and eggshells. The conversion of fruit peeling cellulose biomass into cellulosic-alkanol on one part and egg shells into calcium acetate (gelling agent) on the other part yields Bio-Alkanol gel, a form of renewable energy that burns with a clear flame without smoke or soot. Its a novel innovation which spares a thought for those rural communities to ensure that we (a) mitigate against deforestation at L. Victoria water catchment areas (b) tame the silent killer (smoke) in the kitchens of rural East Africans resident in the L. Victoria basin

The Higher Heating Value (HHV) of gel was 20.50 MJ/kg determined from the adiabatic bomb calorimeter and the Lower Heating Value (LHV) of the gel was 17.50MJ/kg. It's comparable to gaseous cooking fuel such as LPG in terms of cooking efficiency. The gel fuel is reusable for subsequent fireplace sessions. It has been tested that 1 litre of gel burns continuously for 10 hours on high output (1.5kW) and can be used for 4 days for a family of 5 persons. It works with a fabricated stove, which is extremely fuel efficient, a quick cooker that will attain maximum and optimum operating temperature in less than 1 minute after ignition. This is unlike a charcoal jiko, which takes longer to reach optimum temperature. It will also extinguish instantly with a turn of the flame regulator. The gel has the potential of repelling mosquitoes. The low level of emissions from the products of combustion of the gel makes it one of the most suitable fuels for use. It has the potential of Reducing In-Door Air Pollution which is a major cause of upper respiratory ailments in the population. It will reduce deforestation mainly caused by falling of trees for fire wood and charcoal production.

In terms of climate change mitigation, the use of Bio-Alkanol gel will reduce harmful CO emissions into the atmosphere, directly mitigating Global Warming and Climate Change. There will be zero carbon monoxide emissions within households, no soot and smell emissions, and other dangers such as fires caused by wood, charcoal and kerosene fuel and the injuries/fatalities inflicted. It also has the potential of reducing environmental pollution thus promoting conservation of biodiversity. Mass production of the gel will accelerate industrialization while promoting sustainable economic growth hence enhancing improved health and livelihood.

KEY WORDS: Alkanol, Bio-Fuel, Bio-Alkanol, Biomass, Fermentation, Gel

## **12.4:** SEEDED CONTAINER – BASED CONTAINER BASED SANITATION AS A POTENTIAL FEACAL SLUDGE MANAGEMENT OPTION FOR PERI –URBAN SETTLEMENTS: CASE STUDY – NCHIRU, MERU, KENYA

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### Abstract

Sanitation provision has continued to be a challenge in developing countries, with onsite technologies being widely adopted among periurban and poor urban settlements. Recent innovations have seen the development of context-specific low-cost technologies. However, the emerging technologies are currently operating at a small scale and require appropriate testing before full-scale implementation. This study evaluated the performance efficiency of Seeded Container-based Sanitation-Urine Diverting Dehydrating Toilets (SCBS-UDDT) as an option for peri-urban settlements. The CBS-UDDT sanitation model ensures the source separation of faeces and urine, which are collected in sealable containers. In the SCBS-UDDT model, the faeces container was seeded with actively feeding BSF larvae before being introduced for fecal sludge (FS) collection, allowing for FS conversion on-site. Six experimental CBS-UDDT systems were installed in six peri-urban households within Nchiru: among which 3 were seeded with 5 days BSF larvae whereas three acted as control where the waste was collected daily

and transported for treatment at MUST SRI via BSF larvae, continuous feeding model. Samples were taken at three-day intervals for analysis of; i) growth performance, ii) Protein, fats, and carbohydrates as nutritional components of the Black Soldier Fly (Hermetia illucens) larvae during and after fecal sludge treatment. SPSS version 25 software was used to analyse the data, which was then presented using tables, frequency distribution curves, and figures. The results provided insights into the effects of seeding on the CBS system and the associated implications for waste management. The Total suspended solids varied between 24.6±1.5 and 22.4±1.5 for Seeded treatments while non-seed treatments recorded a relatively higher mean range between 30.5±1.8 and 32.1±2.1) where a significant variation occurred between the two treatments at p<0.05. Volatile suspended solids (%) varied between 20.6±1.4 and 22.7±1.4 for Seeded treatments; while non-seed treatments recorded a relatively higher mean VSS range between 28.5±1.6 and 29.5±1.9, a significant variation occurred between the two treatments at p<0.05.

Moisture content varied between  $67.9\pm1.8$  and  $77.6\pm1.5$  for both seeded and non-seeded treatments, with seeded treatments recording relatively higher readings which varied significantly between the two treatments (SH and NH) at p<0.05. The Crude protein content varied significantly between the two treatments (SH and NH) at p<0.05 which varied between  $38.6\pm1.7$  and  $39.9.\pm2.3$  for seeded and  $35.5\pm1.0$  and  $36.0\pm0.4$  for nonseeded treatments. The Carbohydrates mg/ml content varied significantly between the two treatments (SH and NH) at p<0.05 which varied between  $1.2\pm0.4$  and  $1.3\pm0.5$  for seeded and  $0.8\pm0.0$  and  $0.88\pm0.00$  for nonseeded treatments, with seeded treatments recording a relatively higher reading. The fat concentration (%) varied between  $20.2\pm3.0$ . and  $21.0\pm3.5$  for seeded and  $18.4\pm0.9$  and  $19.0\pm0.7$  for non-seeded treatments, with seeded treatments recording relatively higher readings.

Study findings show that seeded Container-Based Sanitation- Urine Diverting Dehydrating toilet provides an effective climate resilient FS management strategy across the entire service chain that are resist. It provides a win-win situation in promoting resource recovery as well as enhancing sanitation management.

## **12.5:** EXCLUSION AND DISCRIMINATION IN WATER, SANITATION AND HYGIENE (WASH) SERVICE DELIVERY: A CASE OF MUKURU KWA REUBEN, KENYA,

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### Abstract

Access to water, sanitation, and hygiene (WASH)—including drainage-services—is essential for public health and socio-economic development. This is emphasized by SDGs, Goal 6: Clean water and sanitation, that is guided by the principle of "leave no one behind" (UN 2015). Despite this, access to water, sanitation and hygiene (WASH) services remains inadequate and inequitable, especially in low- to middle-income countries. Inequity and inadequacy in WASH services disproportionately affect vulnerable groups, especially in low and middle-income countries (LMICs), negatively impacting on their health, livelihood, and education opportunities.

In this study, we sought to explore the understanding of vulnerability as applied in WASH context, and explored various forms in which the groups are affected while in the pursuit for WASH services.

The study was conducted within Mukuru kwa Reuben informal slum settlement, Nairobi, Kenya. A cross-sectional participatory design using qualitative methods of data collection was carried out. To get an in-depth understanding on this, five focus group discussions were conducted; 1) women of reproductive age 2) men of reproductive age, 3) community leaders, 4) religious leaders, 5) Youth. Additionally, in-depth interviews were undertaken with PWDs to saturation point, female headed households, and minority religious representatives. Observations were made to assess the ease with which facilities (water and sanitation) in the community are accessible to different users.

Thematic content analysis approach was used to analyze the generated qualitative which informed the writing of the abstract.

To study participants, vulnerability meant failure by Government to recognize the WASH needs for slum population during their planning processes. This includes non-existent or limited representation in decision making processes that can lead to poor location or access to the services limited by technology choice-religious, social and cultural needs. Vulnerability also refers to denial of platforms to voice concerns, related to justice in instances of biased denial. It was stated that vulnerability

may be obvious or concealed, and thus require deliberate strategies to ensure appropriate redress.

Study participants identified women and girls, the elderly & PWDs, religious minorities and children as the vulnerable groups. These groups faced varying challenges while in pursuit for WASH services. The vulnerabilities faced were identified as either obvious (easy to notice) or concealed, where individual had developed coping mechanisms, concealing the struggles they faced. Key vulnerabilities identified include: lack of access to water and sanitation, lack of voice, sex for services, high cost for WASH, poor WASH infrastructure designs, cultural beliefs and practices and topological poverty.

Available WASH infrastructure designs hinder use by PWDs and the

elderly. Women and girls expected to address WASH needs of these groups. Other factors associated with vulnerability and exclusion include: religious beliefs and topological, poverty. Vulnerability and exclusion is revealed in several ways linked to geographical, social, economic, technological and institutional barriers. Enhanced articulation of the issues, amplified awareness and cautious efforts to design and finance appropriate interventions that address the exceptional needs of the different categories of people is desirable. This requires consistent evidence-based advocacy to bring the issues to the attention of planners and decision makers, and building sector capacity to deliver context specific solutions.

Additional is development of inclusive WASH policies.

## **12.6:** EFFECT OF GUM ARABIC FROM ACACIA SENEGAL VAR. KERENSIS AS AN IMPROVER ON THE RHEOLOGICAL PROPERTIES OF WHEAT FLOUR DOUGH.

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### Abstract

Dough improvers are substances with functional characteristics used in baking industry to enhance dough properties. Currently, the baking industry is faced with increasing demand for natural ingredients. This is because of the growing preference among consumers whereby they are inclining more towards healthier and safer ingredients. Thus, the rising demand for natural hydrocolloids. Gum Arabic from Acacia senegal var. kerensis is a natural gum exhibiting excellent water binding and emulsification capacity. However, very little is reported on how it affects the rheological properties of wheat dough. The aim of this study was therefore, to determine the rheological properties of wheat dough with partial additions of gum Arabic as an improver. Six treatments were analyzed comprising of: flour-gum blends prepared by adding gum Arabic to wheat flour at different levels (1%, 2% and 3%), plain wheat flour (negative control), commercial bread flour and commercial chapati flour (positive controls). The rheological properties were determined using Brabender Farinograph, Brabender Extensograph and Brabender Viscograph. Results showed that addition of gum Arabic significantly

(p<0.05) increased dough development time (1.44-6.45 minutes), water absorption capacity (59.34-59.96%), stability (6.34-10.75minutes), mixing tolerance index (12.00-35.80), Farinograph quality number (48.60-122.20) and time to breakdown (4.33-12.05minutes). However, there was no significant effect of gum Arabic addition on dough consistency (490-505 BU). In extensograph properties, energy was significantly (p<0.05) higher in wheat flour containing 2% gum Arabic (108.44 cm2), while extensibility was significantly higher in wheat flour containing 3% gum Arabic (153.11mm). Gum Arabic significantly (p<0.05) decreased all the Viscograph parameters apart from the pasting temperature (69.82-71.68° C). The findings of this study show that gum Arabic significantly (p<0.05) enhanced the rheological properties of the dough. An optimal gum Arabic concentration of 2% in wheat flour dough is recommended for pan bread and 3% for chapati. These findings show that gum Arabic was able to act as a dough improver and support the need to utilize gum Arabic from Acacia senegal var. kerensis as a substitute for synthetic improvers.

## **12.7:** ADSORPTION OF LEAD AND RHODAMINE B FROM WATER USING AGRICULTURAL WASTES, CARBON NANOTUBES AND COBALT FERRITE NANOCOMPOSITE,

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#### Abstract

Discharge of untreated or partially treated effluents into water sources introduces pathogenic, organic, and inorganic pollutants, posing significant risks to human health and the environment. For instance, lead, an extremely toxic heavy metal, disrupts various plant physiological processes and causes inhibition of hemoglobin synthesis in humans, leading to dysfunctions in various bodily systems. Additionally, dyes in water bodies compromise aesthetic quality, impair photosynthesis and promote toxicity, mutagenicity, and carcinogenicity.

Various technologies have been employed for removal of heavy metals and dyes such as chemical precipitation, biodegradation, ion exchange, reverse osmosis, ultrafiltration and coagulation. However, these methods have several disadvantages such as high reagent requirement, unpredictable metal ion removal and generation of toxic sludge.

The current study sought to synthesis and characterize Agricultural Wastes (AW), functionalized Carbon Nanotubes (CNTs) and cobalt ferrite (CoFe2O4) nanocomposite and utilize it as a novel adsorbent

for the removal of Pb2+ ions and Rhodamine B (Rh. B) from water. Use of nanocomposite was preferred due to its high adsorption capacity, reusability for multiple adsorption cycles and removal efficiency for both organic and inorganic pollutants. In addition, the incorporation of magnetic material (CoFe2O4) improves the removal efficiency of heavy materials. Further, functionalization of CNTs was undertaken to introduce various functional groups like carboxyl, carbonyl and hydroxyl groups to CNTs walls which provides new adsorption sites.

Agricultural Wastes (AW) were collected from farms, washed, dried and carbonized while carbon nanotubes were functionalized in a nitric acidsulfuric acid mixture and CoFe2O4 were prepared by co-precipitation method. River water was collected from Athi River while aqueous solutions were prepared at University laboratory. Batch experiments involved the study of the effects of pH, temperature, concentration of the adsorbates, adsorbent weight and contact time on Pb2+ ions and Rh. B removal. Residual concentration of Pb2+ ions was determined by Atomic Absorption Spectrophotometer (AAS) while that of Rh. B was determined by Ultraviolet-visible (UV-vis) spectrophotometer. Characterization of the adsorbent was carried out by Scanning Electron Microscopy (SEM), Energy Dispersive X-ray spectroscopy (EDX) and Fourier transform infrared (FT-IR).

SEM micrographs showed highly porous morphology and a coarse surface texture with pores and cavities of different shapes and sizes. FTIR analysis displayed the predominant functional groups to be carboxylic groups, hydroxyl groups and carbonyl groups. Adsorption isotherm models (Langmuir, Freundlich, Dubinin- Radushkevich (D-R) and Temkin and adsorption kinetic studies (pseudo-first order, pseudo-second order, intra-particle diffusion and liquid film diffusion model rate equations) were used for data analysis. The results showed that adsorption was affected by pH, weight and particle size of adsorbents, speed and contact time. The experimental data were slightly better suited to the Freundlich isotherm and pseudo-second order kinetics with removal capacities of AW-CNT-CoFe2O4 being 4.1087 mg/g for lead and 2.88 mg/g for Rh. B dye.

Overall, this study underscores the potential of the AW-CNT-CoFe2O4 nanocomposite as a novel and efficient adsorbent for water and wastewater treatment, offering promising solutions to address the challenges associated with water pollution.

*Key words:AW-CNT-CoFe2O4 Nanocomposite, Adsorption, Characterization, and Rh. B.* 

## **MICROCREDITS AS ENABLER FOR SMALL ENTERPRISE'S** FOSTER ACHIEVEMENT OF KENYAN VISION 2030

**Prof. Peter Paul Kithae** 

Management University of Africa **THEME:** Catalysing systemic social transformation through research and innovation **SUB THEME:** Digital Superhighway and Creative Economy **TOPIC:** Microcredits as enabler for Small Enterprise performance in support of Kenyan vision 2030. By Prof. Peter P. Kithae The Management University of Africa

### Abstract

Kenya is a global leader in advancing financial inclusion through the use of digital finance solutions, having made large investments in ICT services and infrastructure over the previous 20 years. Additionally, it has created ecosystems that facilitate local, national, and international transactions. The purpose of this study was to determine how microcredits could help small enterprises support Kenyan Vision 2030. The study's specific objectives were to: i) determine how credit repayment schedules affect small business performance; and ii) analyze the relationship between small business performance and repayment mechanism (e-banking). The findings of the study should be helpful to scholars, researchers, and small business owners as well as policy makers in the industry. A descriptive research design was employed. 145 small business owner managers in Kerugoya municipality, Kenya who benefited from various MFI credits were chosen through the use of stratified random sampling method. Questionnaires with closed ended likert scale type questions were selfadministered to give quantitative data. A pilot study was conducted to assess the accuracy of the research instruments in order to

ensure the validity and dependability of the research findings. Descriptive statistics like mean and standard deviation were used for data analysis. Regression analysis was performed using the Statistical Package for Social Sciences (SPSS) version 20 to ascertain the relationship between the independent and dependent variables. The research results were displayed using graphs, pie charts, and frequency tables. Repayment schedules were found to have no statistically significant effect on business performance, whereas e-banking accounts for 53.6% of firm performance. The study concluded that e-banking has a positive and significant impact on firm performance. According to the report, small business managers should choose the most effective e-banking method and utilize it to achieve maximum company performance.

*Key Words:* E-banking, Microcredits, Repayment Schedule, Small Business Sector
### **12.9:** RISK FACTORS ASSOCIATED WITH NON-COMMUNICABLE DISEASES BURDEN IN KENYA- A SYSTEMATIC ANALYSIS OF BURDEN OF DISEASE STUDY FOR 369 DISEASES AND INJURIES (1990-2019).

#### Josephine Wanjiku Ngunjiri,

Senior Lecturer, University of Embu, Kenya. Global Burden of Disease collaborator Institute of Health Metrics and Evaluation, Washington University, Seattle, USA. Young Affiliate (2019), The World Academy of Sciences Trieste, Italy.

#### Peter Njenga Keiyoro

Associate Professor, School of Open and Distance learning (Biological Sciences) University of Nairobi, Kenya. Global Burden of Disease collaborator Institute of Health Metrics and Evaluation, Washington University, Seattle, USA

#### Abstract

Trends and patterns in burden of disease help in setting health priorities globally, nationally and at sub-national levels. Non - Communicable Diseases (NCDs) burden remain on the rise and is associated with metabolic, behavioral and environmental/occupational predisposing risk factors. The NCDs are likely to complicate management of infectious diseases, maternal and neonatal health outcomes. Global Burden of Disease (GBD) provides a standardized and comprehensive estimate of the risk factors and attributable burden. The burden of disease and risk factors level of exposure in this study were estimated based on all data sources available for Kenya. This was done using three main tools, which included the Cause of Death Ensemble model (CODEm), Spatiotemporal Gaussian Process Regression (ST-GPR), and DisMod-MR. Analyses were completed using Python version 3.6.2, Stata version 13, and R version 3.5.0. Cardiovascular diseases were the leading cause of death in 2019, for age-standardized ranking for both sexes with 239.75 deaths per 100,000 (203.06-276.18), which was a 6.15% increase. Their morbidity was ranked second for age-standardized ranking for both sexes with 4,8334.03 DALYs per 100,000 (4,112.97-5,565.22) which was a 3.98% increase. Diabetes and chronic kidney diseases were ranked seventh cause of death for age-standardized ranking for both sexes

with 58.76 deaths per 100,000 (51.33-66.51), which was a 18.48% increase since 1990. Neoplasms caused more deaths in 2019, with 105.97 deaths per 100,000 (89.62-126.75) which was a 34.31% increase and were ranked fourth cause of death nationally. However, health disparities in the counties for NCDs burden were observed. For instance, cardiovascular diseases were leading cause of DALYs in most counties except in Turkana, followed by Migori, Isiolo, and Garissa. Risk factors identified in this study associated with NCDs were ambient particulate matter pollution, high Low-Density Lipoprotein (LDL) cholesterol, high body mass, physical inactivity, high sodium intake, diet low in fruits, nuts, whole grains, milk and vegetables. These risk factors should be addressed through policies, behavioral change, quality diet and reduced pollution. Such efforts geared towards eliminating the risk factors will consequently lead to reduction in NCDs' burden. This will improve the quality of life, life expectancy, management of infectious diseases, maternal and neonatal health outcomes.

**Key words:** non-communicable diseases, morbidity, mortality, aging population and risk factors.

Funding: Bill & Melinda Gates Foundation

# TRACK 3: CATALYZING THE RESEARCH ECOSYSTEM

FOR UNIVERSITY EDUCATION .73

## T3.1: CATALYZING THE RESEARCH ECOSYSTEM WITHIN KENYA: THE "CREATION-INCENTIVIZATION-ENHANCEMENT-INFUSION APPROACH.

1. Ochieng', J. Kennedy ochiengjkennedy@gmail.com

#### Abstract

At their graduation from universities in Kenya, learners are accorded the "...power to read..., and all that appertains to it..." Ideally, graduates should then enhance their academic standing by reading (and conducting research inquiries). However, the Kenyan research ecosystem is characterized by notable apathy from such should-be participants. While the onus is on graduates to embrace reading and research post-bachelors, many other stakeholders also have roles to play.

At its core, this study aims to inform thought, policy, and practice in/ around "Research and Innovation as Catalysts for Systemic Societal Transformation" particularly in the realm of environmental management. The study indicates that a strong research ecosystem could inspire novel solutions to environmental challenges through a wide array of innovations and new thinking on sustainable development/operations in the realms of agriculture, waste management, industry, and even climate change action.

This qualitative meta-synthesis paper conducts a systematic examination

of available literature in search of empirical evidence of the prevailing situation within the Kenyan research ecosystem; and the modalities of achieving the intended goal of research "incentivization". In addition, the paper discusses the possible approaches to incentivizing Kenya's research ecosystem. The paper examined nine databases, from where it selected 44 journals, accessed and found 28 of them very relevant/ applicable, and finally consulted 12 among them. Through analysis of the contents of such sources, the paper established four different considerations with regard to catalyzing the research ecosystem in Kenya.

Findings of the research reveal that there exists a high apathy of graduates, along with disjointed modalities of information and data exchange, and the decentralization of knowledge registration and sharing within the Kenyan research ecosystem. It also established the inadequacy of research funding, and low economic returns to researchers, and limited prestige gain therein. The findings also established four approaches that may catalyze such research ecosystem. First is the creation of

enabling policies and legislations by government actors/agents to enable post-graduate research. The second is the incentivization of research & innovation (R&I) efforts and engagement for would-be researchers, both economically and in terms of prestige. The third approach is the enhancement of strategic public-private sector partnerships (PPPs) in the realm of research and innovation to help inject impetus into research uptake. The final approach is the infusion of professionalism into the Kenyan research and innovation ecosystem by making such space more objective and non-discriminatory.

Overall, the paper concludes that catalyzing the research ecosystem in Kenya could help in the application of Research and Innovation... for Systemic Societal Transformation in realms such as environmental management and climate change risk adaptation and/or mitigation.

Key words: Societal Transformation, Professionalism, Economic Survival, Infusion, Catalyst, Research and Innovation (R&I), Incentivization, Strategic Private-Public Partnerships (PPPs), Apathy, Enhancement, Enabling Legislation, Apathy, Risk Adaptation

# **13.2:** PROMOTING SUSTAINABLE AND ETHICAL RESEARCH PRACTICES IN HIGHER EDUCATION, KENYA

Dr. Loice Korir (Umma University)

School of Business and Technology

#### Abstract

This study aims to investigate and promote sustainable and ethical research practices within higher education institutions. It provides a comprehensive framework for integrating sustainability and ethics into research processes, emphasizing collaboration, transparency, and accountability, while also focusing on the incorporation of principles such as environmental stewardship and social justice. The study employs a mixed-methods approach, combining qualitative and quantitative methods to gather data from diverse stakeholders in higher education. Theoretical frameworks from sustainability science and research ethics guide the analysis and interpretation of findings. Measurements include surveys, interviews, and document analysis to assess current practices and identify areas for improvement. The research design involves a multistage process, including needs assessment, policy development, and implementation of sustainable and ethical research initiatives. The target population consists of researchers, faculty members, students, administrators, and other stakeholders in higher education. Reliability

is ensured through rigorous data collection and analysis methods, as well as validation through peer review and stakeholder feedback. The study's uniqueness lies in its comprehensive approach to integrating sustainability and ethics into research practices, addressing the interconnected challenges and opportunities within higher education. In conclusion, the study highlights the critical importance of promoting sustainable and ethical research practices for the long-term well-being of individuals, communities, and the planet, with recommendations including investing in training and education, developing institutional policies and guidelines, and fostering interdisciplinary collaboration. The expected impact of the research includes informing policy changes, enhancing research quality, and fostering a culture of responsible research conduct, thereby contributing to the advancement of sustainable and ethical research practices in higher education.

Key words: Sustainability, ethical research practices, higher education.

### **T3.3: ENHANCING COMPLETION RATES FOR SUSTAINABLE PHD TRAINING IN KENYA: THE INFLUENCE OF SUPERVISOR AND PEERS ON PHD STUDENTS' SENSE OF BELONGING AND THEIR SUCCESS AT KENYAN UNIVERSITIES**

Hyrine Matheka Commission for University Education

#### Abstract

The government of Kenya through the Vision 2030 has set out its aspirations of achieving a middle-income knowledge economy status through developing high qualified professionals in research and innovation. The government is consequently keen to double the number of PhD graduates to achieve the targeted 2400 graduates per year. PhD training is the pinnacle of research training and education. However, despite the government policy to increase the number of PhD graduates, the graduation rates remain low at 13%. Extant research indicates that there exist varied determinants of PhD students' success categorized into individual, supervisory and peer relationships, and institutional factors. This paper seeks to disseminate the findings of a study whose purpose was to establish the relationship between students' background characteristics, supervision and peer relations, sense of belonging, and PhD students' success We used an online questionnaire to collect data from 614 ongoing and recently graduated PhD students, we undertook correlation and path analysis to process it. The findings of the study

show that PhD students' age, supervision, peer support, self-efficacy, mode of study and sponsorship significantly correlate to their success. Further, analysis through structural Equation modeling showed that PhD students' age, sense of belonging and the quality of supervision directly relate to their success. Interestingly, peer support, though not directly influencing success, showed the highest total effect on PhD students' success, closely followed by age, supervision and sense of belonging. Consequent to the findings, we advance the thesis that to improve the PhD graduation rates in the country, universities management needs to put in place efforts to encourage enrolment to PhD studies at a younger age while investigating the underlying factors that cause delay by older students. Further, there is need to strengthen efforts to enhance the quality of supervision and peer support available to PhD students. In my presentation, I will delve deeper into specific supervision and peer support factors that may help policies makers to develop specific strategies to enhance PhD success in Kenya.

### **T3.4: OPPORTUNITIES FOR RESEARCH AND KNOWLEDGE DISSEMINATION: LEVERAGING ON UNESCO PRIZES, AWARDS, GRANTS AND FELLOWSHIPS FOR ADVANCEMENT OF SOCIETY.**

James Njogu, Joel Ongoto, Mary Kang'ethe, George Eshiamwata, Julius Mwahunga, Angela Muchai Kenya National Commission for UNESCO sg@unesco.go.ke

#### Abstract

The mandate of the Kenya National Commission for UNESCO is to promote Kenya's national interests in UNESCO and UNESCO's international interests in Kenya, regionally and globally in the areas of education, sciences, culture, and communication and information. This is pursued through collaborations and partnerships that promote generation and dissemination of knowledge and information. One of the barriers to research is lack of funding opportunities or recognition of outstanding research and innovations. As a member state, Kenya has access to UNESCO prizes, awards, fellowships and study grants. However, there has been a concern about low uptake of UNESCO prizes, awards, fellowships and study grants by Kenyans compromising the ability of Kenya maximizing on these competitive opportunities. This low uptake could be attributed to lack of awareness about timelines, requirements, eligibility criteria and application process. To address these challenges and increase uptake, the Kenya National Commission for UNESCO considers enhancing its outreach efforts through targeted campaigns

and actively engaging with diverse audiences to ensure inclusivity and broaden the reach of UNESCO opportunities thus attracting a more diverse pool of applicants. Benefits from increased uptake include increased resources for research, recognition and validation of exceptional achievements, provides motivation and inspiration. Additionally, this can highlight exemplary work and serve as a platform to showcase best practices, breakthroughs, and innovations. The Conference provides an excellent platform to raise the visibility of these opportunities. During this session, the Commission will present existing opportunities with the aim of ensuring that Kenyans maximize on them.

### **T3.5:** FACULTY SHORTAGES IN KENYA'S EXPANDING HIGHER EDUCATION SYSTEM: A CALL TO ACTION

Daniel Omanyo, Pauline Essah, Lucy Heady, and Salome Guchu. INTER UNIVERSITY COUNCIL OF EASTERN AFRICA

#### Abstract

Kenya's university education sector has witnessed a remarkable rise in student enrolment in the past decade. However, concerns remain regarding the adequacy of faculty numbers to support this growth (2017 faculty and student enrolment figures used). A robust, wellstaffed faculty is crucial for delivering quality education and achieving national transformation goals. As part of the Demographics of African Faculty (DAF) initiative within the East African Community (EAC), funded by the Carnegie Corporation of New York (grant number G-21-58066), this study is a collective effort. The consortium involved in this study included the Inter-University Council for East Africa (IUCEA), Education Sub-Saharan Africa, the Association of African Universities, and the Population Reference Bureau.

The study's primary focus is to assess the state of faculty in university education. It analyses adherence to policy norms set by Kenya's Commission for University Education (CUE) in four key areas: faculty distribution by discipline, student-teacher ratio (STR), gender

representation, and faculty growth rate. The study adopted a mixedmethods approach that involved data collection at various national offices, including the Ministry of Education, CUE, the Kenya National Bureau of Statistics, and the Kenya Universities and Colleges Central Placement Service. Additionally, desktop reviews were conducted to gather background information on university education practices in Kenya, encompassing policy norms, academic staff mobility trends, and student enrolment statistics. Key informant interviews were also conducted with individuals within these institutions, enriching the quantitative data with valuable qualitative insights. Furthermore, the study employed the DAF model to forecast future faculty supply and demand within the Kenyan university education system. The DAF model is an MS Excel-based quantitative model that projects faculty needed to meet policy norms using data on student enrolment in the current period, projected student enrolment, number of faculty in the current period, faculty exit rates and policy norms.

Based on 2017 data, the analysis revealed a consistent shortfall in faculty across all disciplines compared to CUE's recommended STR. An additional 25,961 faculty members are needed to meet student demand and achieve targeted STRs by 2030. The highest faculty shortages are in Natural Sciences, Engineering, and ICTs (29%), followed by Arts, Humanities, and Business (24%) and Education (23%). This faculty shortage strains the system's capacity to deliver quality education and hinders research productivity and innovation within universities. Limited faculty supervision restricts opportunities for postgraduate research and collaboration, ultimately impacting the quality of graduates entering the workforce.

To address this challenge, the study recommends investment in data collection and management across the university education system. This will provide us with the necessary insights to make informed decisions. Considering current expansion and international best practices, there is

also an urgent need to re-evaluate university education faculty norms. This will ensure that our norms align with the changing needs of our education system. Furthermore, targeted initiatives could be developed to attract and retain qualified faculty, potentially including capacity-building programmes and competitive compensation packages. These initiatives can help us build a strong and sustainable faculty base. Finally, we recommend that this analysis be repeated as soon as the most recent data becomes available to ensure that we are always up to date with the evolving needs of our university education system.

#### Key words: Faculty Shortage, DAF, Policy Norms, Student-Teacher Ratio

**Reference:** IUCEA (2023). Demographics of African Faculty in the East African Community

### T3.6: PROTECTING THE ECOSYSTEM THROUGH ENVIRONMENTAL AUDIT: EMERGING ISSUES, CHALLENGES, AND FUTURE DIRECTIONS

Antony Wafula Wanyonyi,

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#### Abstract

This study determines the current and emerging issues and the challenges in the field and recommends measures for governments and the supreme audit institutions to enhance environmental conservation through auditing. It reviews the literature, analyses cases of different countries through document review, and interviewed experienced auditors from different audit institutions during an exchange program at Nanjing Audit University.

The trends and issues identified include computerized or digital tools in environmental audits, interdisciplinary collaboration, and a shift in the focus of environmental audits. The primary challenges are limited resources, increasing standards and requirements, integrated auditing, deficiency, and lack of consistency. Furthermore, the review reveals that environmental audit receives minimal attention in emerging economies. There is minimal documentation on the effectiveness of the adopted policies, measures, and standards. Supreme audit institutions (SAIs) in developing countries should provide more guidance on existing and upcoming auditing standards and requirements. A follow-up initiative through real-time and accountability audit might be necessary to ensure the project's compliance with environmental standards.

The SAIs and the related organizations should also develop useful audit

tools, systems, and procedures to ensure that the statutory rules observe and abide by the environmental standards and requirements. In addition, they should offer more training for the auditors to equip them with skills and knowledge to respond to the changing and complex environmental issues. Partnerships and collaboration among Supreme Audit Institutions could also help solve the complexity of some environmental audit matters and the challenge of limited resources. For instance, the East African Community can join forces to address transboundary environmental issues such as biodiversity conservation, air and water pollution, and illegal wildlife trade. The joint audits and initiatives can address shared environmental challenges efficiently and effectively.

The study implies that future efforts should enhance institutional capacity, promote multi-stakeholder collaboration, and leverage innovative technologies. Furthermore, promoting knowledge sharing and public participation while integrating environmental auditing into sustainable development strategies is necessary for developing countries to cultivate a culture of environmental responsibility and accountability.

**Key words:** Environmental Audit, Sustainability, Environmental Protection, Supreme Audit Institution, Computerized Audit, and Interdisciplinary Collaboration.

### T3.7: TOWARDS OPEN INNOVATION ECOSYSTEMS: LEVERAGING OPEN SCIENCE FOR SOCIAL TRANSFORMATION

Kamuri Mary Wanjiku

Technical University of Kenya

#### Abstract

The idea of open innovation ecosystems has gained popularity recently as a way to promote teamwork, creativity, and societal effect. This study examines how open innovation ecosystems and open science interact, concentrating on how they might spur social change. This research paper examines the concepts of open science and open innovation, their opportunities, and problems. It then suggests ways to use these ideas to address important social issues. The paper emphasizes the value of inclusivity, transparency, and cooperation in creating open innovation ecosystems that lead to significant societal change by drawing on case studies and theoretical frameworks.

*Key words:* social transformation, open science, open innovation ecosystems, cooperation, inclusivity

### SUSTAINABLE AND ETHICAL RESEARCH

Mordekai Ongo, PhD. Andrews University Berrien Springs, MI USA.

Duane Covrig, PhD. Kettering College Kettering, OH USA

Cesiah Pimentel, The Adventist School of Medicine of East Central Africa Kigali, Rwanda

In the increasingly global community of biomedical and social behavioral sciences, the integrity of research has never been more numerous disciplines including science, innovative and emerging important to the scientific enterprise. With global environmental challenges and increasing societal demands for ethical conduct, it science, and ethics to provide a holistic approach to research is imperative that the research community uphold the value of sustainable and ethical research practices. "Research integrity is a are considered: social and environmental responsibilities, ethical commitment, sometimes in the face of adversity, to the trustworthiness of the research process by the greater scientific community. It is important even critical because the greater scientific community can only innovate and flourish when its members function together as a body to ensure a climate that promotes confidence and trust in our research findings, encourages free and open exchange of research materials and new of responsible research conduct requires a clear multifaceted ideas, upholds personal and corporate accountability, and acknowledges and respects the intellectual contributions of others frameworks, stringent data management practices, and effective in the greater community." (Northeastern University). To improve prevention measures to avoid research misconduct (falsification sustainable and ethical research practices, researchers, practitioners, and students need ethical training in responsible conduct of research and how to apply the skills and attitudes of research integrity throughout the research design, implementation, contributing to environmental solutions and promoting and dissemination of knowledge.

This presentation provides a framework of principles from technologies, social and behavioral sciences, environmental design, implementation, and dissemination. Several key anchors conduct, knowledge, collaboration and dissemination, and evaluation.

The promotion of research integrity and ethics is paramount in sustaining trust within the scientific community and ensuring the reliability and credibility of scholarly output. Fostering a culture approach that includes implementation of robust ethical and fabrication of data, and plagiarism). Sustainability in research and minnovation has become increasingly urgent in the face of escalating environmental challenges. Research has a vital role in sustainable research practices, in alignment with the United Nations Sustainable Development Goals.

The pursuit of research and innovation must be guided by a commitment to fostering positive social impact, addressing ethical concerns inherent in emerging technologies such as Artificial Intelligence (AI), and promoting responsible innovation practices in the 21st century. AI and the ethics of how we are interacting with it is critical in research. Adoption of responsible innovation practices is necessary to ensure that research addresses ethical dilemmas posed by emerging technologies and benefits society equitably.

The character of researchers is considered. If researchers lack personal integrity, rules that prevent violations of research integrity become meaningless. Character forms a key component in sustainability and ethical research. Character molds the researcher from the inside out and outside in. A blend of research competency skills, moral commitments, and ethical attitudes is critical.

#### 84. COMMISSION FOR UNIVERSITY EDUCATION

**PROGRAMME** 



### **COMMISSION FOR UNIVERSITY EDUCATION**

# 4тн Biennial Conference on Universities Research and Innovation



### CATALYZING SYSTEMIC SOCIAL TRANSFORMATION THROUGH RESEARCH AND INNOVATION



Kenyatta International Convention Centre (KICC), Nairobi



**COMMISSION FOR UNIVERSITY EDUCATION .83** 





### Opening Ceremony Venue: Amphitheatre

Time	Activity	Session	Facilitators	
8:00 -8:30 A.M.	Arrival of Guests, Registration	Guests register and collect conference materials	Conference Secretariat	
8:30 – 8:35 A.M.	National Anthem/EAC Anthem	Dr. David Muthaka,		
8:35-8:40 AM	Opening Prayers	Deputy Commission Secretary, Planning Research,	Rapporteurs: Dr. Monica Gachunga an	
8:40-8:50 AM	Entertainment	and Innovation	Claris Adoyo	
8:50-9:00 AM	Opening Remarks and Introductions	Commission for University Education (CUE)		
9:00-9-10 AM	Welcome Remarks	Prof. Mike Kuria,	Chair: Dr. David Muthaka	
		Commission Secretary/ CEO Commission for University Education (CUE)		
9:10-10:10 AM	Brief Remarks	Prof. Daniel Mugendi – Vice Chancellor, University	of Embu; Chairperson Vice Chancellors of	
		Public Universities Kenya.		
		Eastern Africa (CUEA); Chairperson: Vice Chancellors of Private Universities Kenya.		
		<b>Prof. Gaspard Banyankimbona,</b> <i>Executive Secretary, Inter University Council for East Africa</i> (IUCEA)		
		Monica Blagescu Head of Education   Kenya, British Council		
10:00 –10:10 AM	CUE Chairman's Address	Prof. Chacha Nyaigotti – Chacha		
		Chairperson, Commission for University Education Board		
10:10 - 10:20 A.M.	Principal Secretary's Address	Dr. Beatrice Muganda Inyangala		
		Principal Secretary, the State Department for Higher Education and Research, N		
40.00 AM		Education Kenya		
10.20 AM		Chief Quest Han Frakish Mashamy 5011		
		Chief Guest: Hon Ezekiel Machogu, EGH		
	Exhibition I our	Cabinet Secretary, Ministry of Education		



12:00PM-12:20PM	Konza Technopolis: A Catalyst for Kenya's Silicon Savannah and Societal Transformation <b>Prof. Raphael Munavu,</b> <i>Chairperson, Konza Technopolis Board</i>	Chair: Dr. Roselida Owuor Director of Research Development, Ministry of Education, Ken	ya
		Rapporteurs: Elizabeth Onyango, Erastus Musa	
12:20PM-12:40PM	Strategies to Promote Sustainable Research Funding		
	Prof. Andala Dickson, CEO, National Research Fund		
12:40PM- 1:00 PM	Plenary Session: Moderator Prof Urbanus Mutwiwa –		
	Deputy Commission Secretary, Planning Research,		
	and Innovation Commission for University Education (CUE)		

Venue	AMPHITHEATRE	IMPALA ROOM	TURKANA ROOM
	Preparing Graduates for the	Digital Superhighway and Creative Economy	Catalyzing the Research Ecosystem
		Chair: Prof. James Tuitoek	Chair: Prof. Mucai Muchiri
	Chair: Prof. Erastus Njoka Rapporteurs: Dr .Benson Murgor; Hudson Nandokha, Evelyne Okewo	Rapporteurs : Dr. Dorcas Omukhulu ; Michael Tanui; Claris Adoyo	Rapporteurs: Dr. Monica Gachunga;, Pius Walela;. Caroline Mbaabu
2:00P.M2:30 P.M.	Leveraging AI, Human Expertise, and the Digital Superhighway for	Building Strong University-Industry Partnerships for Effective Skill Development	Building Capacity and Quality: Challenges and Opportunities in African
	Africa's Thriving Creative Economy	Speaker: Dr. Fred Mugambi Mwirigi	University Research
	Speaker: Dr. Lawrence Nderu Jomo Kenyatta University of Agriculture and Technology	Commissioner, Kenya School of Revenue Administration.	Speaker: Dr. Dorothy Weyler Director DAAD Office Africa
2:30PM -3:00 PM	Leveraging Artificial Intelligence (AI) in Content Delivery	The Role of Leadership in Cultivating Innovation Ecosystems	Catalyzing African Research: Strategies for excellence, outputs, and visibility
	Speaker: Dr. Joseph Orero	Speaker: Prof. Eng. P. N. Kioni	Speaker: Dr. Julius K. Sindi
	Senior Lecturer, Strathmore	Dedan Kimathi University of Technology (DeKUT)	African Population and Health Research
	University		Center (APHRC)
3:00 P.M-3:30P.M	Leveraging on Artificial Intelligence (AI) in Assessment of/as/for	Beyond Access: Unlocking the Potential of the Creative Economy in Africa through Strategic	Strategies for linking Universities with Research Institutions in Kenya
	Learning Speaker: Dr. Christopher Odindo	Development of Digital Skills Speaker: Dr. Winston Ojenge	Speaker: Prof. Elijah Songok, Ag. CEO/DG, KEMRI (Kenya Medical
	De Montfort University, Leicester	African Centre for Technology Studies (ACTS)	Research Institute)
3:30P.M- 4:30PM	Plenary	Plenary	Plenary

END OF DAY ONE



8.00 A.M - 8.30 A.M.	Arrival of Guests, Registration	Conference Secretariat			
8.30 A.M- 9.30 A.M	Entertainment         Future-Proofing Universities: Perspectives of the Regulator         Thematic Speaker 1: Prof. Mike Kuria, CEO, CUE (Commission for University Education)         Building Thriving Research and Innovation Ecosystems: Africa's Role in Shaping the Future of Research & Innovation with diverse perspectives         Thematic Speaker2: Prof. Jamil Salmi; The World Bank (Virtual Presentation)         Fostering International Research Collaboration Through University Networks: The UNA Europa Model         Thematic Speaker 3: Prof. Dolores Oriordan. Vice President for Global Engagement, University College Dublin, (Chair UNA Europa - (Virtual Presentation)		Chair: Prof. Maurice Okoth Rapporteurs: Sarah Ooro /Pius Walela		
9.30 A.M- 10.00 A.M	Plenary				
10.00 – 10.30 A.M.					
	Bre	ak Away Sessions on Conference Tracks			
Venue	AMPHITHEATRE	IMPALA ROOM	TURKANA ROOM		
	Preparing Graduates for the	Digital Superhighway and Creative Economy	Catalyzing the Research Ecosystem		
	Workforce of Tomorrow Chair: Prof. Robert Gateru,VC Riara University	Chair: Rev. Canon Prof. James Kombo, Vice Chancellor St. Paul's University Rapporteur: Benson Gatubu	Chair: Prof. Waceke Wanjohi, Ag. Vice Chancellor, Kenyatta University <i>Rapporteur: Dr. Dorcas Omukhulu</i>		
	Rapporteur : Elizabeth Onyango				
10.30AM – 11.15 A.M	Redesigning Curriculum Delivery for Effective Skills Development in a Digital Age Speaker: Dr. Teresa Oluoch Masinde Muliro University of Science	Championing Sustainable and Ethical Research Speaker: Prof Walter Oyawa CEO, National Commission for Science, Technology, and Innovation (NACOSTI)	Leveraging Science, Technology, and Innovation for Systemic Social Transformation in Africa Speaker: JPR Ochieng'-Odero Adjunct Senior Research Fellow, Strathmore University		
	and rechnology				

#### 11.30 A.M -12:45 P.M

#### **TRACK 1: PAPER PRESENTATIONS**

T1.1: Bridging the gap: Aligning CUE guidelines with competencybased education in postgraduate curricula development.

Dr. Samson Ikinya, Kenyatta University; Dr. Hellen Kiende ,Kenyatta University

T1.2: Integration of Lifelong Learning for Teacher Employability Ochieng, Pamela, Mount Kenya University

T1.3: Analyzing the Effect of Technological Innovation on Employment Pattern in Kenya Faith Wanja Kilaku1 Dr. J. Nthiiri2 Masinde Muliro University of Science & Technology

T1.4: Mental Health Conversations with Students: The Place Of 21st Century Skills Among University Students Today By Margaret Njeri Ngugi1 and Jasper Edward Nyaura2 1 Alupe University 2 Moi University

T1.5: The Role of Universities in Preparing Graduates for the World of Work: The case of a private university in Kenya. Dr, Joab Namai, Daystar University

#### TRACK2: PAPER PRESENTATIONS

T2.1: Transforming University Research Knowledge to Business Startups in Kenya. Dr. Shadrack Mule, University of Kabianga

T2:2: Mapping Longitudinal Mental Health Datasets to OMOP Common Data Model Using OHDSI: A PHQ-9, GAD-7, and PSQ Approach from INSPIRE Network Datahub

By Bylhah Mugotitsa1,2, \* Tathagata Bhattacharjee4, Michael Ochola1, David Amadi4, Dora Mailosi5, Pauline Andeso1, Joseph Kuria1, Evans Omondi<sub>1,6</sub>, Jim Todd<sub>4</sub>, Jay Greenfield<sub>5</sub>, Agnes Kiragga<sub>1</sub>, African Population and Health Research Center (APHRC), Nairobi, Kenya. 2Strathmore University Business School, Strathmore University, Nairobi, Kenya. 3Infectious Diseases Institute, College of Health Sciences, Makerere University, Kampala, Uganda. 4Department of Population Studies, London School of Hygiene and Tropical Medicine, London, United Kingdom. 5AI and ML, CODATA-Committee on Data of the International Science Council, Paris, France. 6Institute of Mathematical Sciences, Strathmore University, Nairobi, Kenya.

T2.3: Bio-Alkanol Gel Fuel as Renewable Energy By Jireri Bonface, Kaimosi Friends University

T2.4: Seeded Container-Based Sanitation as a Potential Feacal Sludge Management Option for Peri-Urban Settlements: Case Study-Nchiru, Meru, Kenya

#### **TRACK3: PAPER PRESENTATIONS**

T3.1: Catalyzing the Kenyan Research Ecosystem, Ochieng,' J. Kennedy

T3.2: Promoting Sustainable and Ethical Research Practices in Higher Education, Kenya By Dr. Loice Korir (Umma University)

T3.3: Enhancing Completion rates for sustainable PhD training in Kenya: The influence of supervisor and peers on PhD students' sense of belonging and their success at Kenyan universities

Hyrine Matheka (Commission for University Education)

T3.4: Opportunities for Research and Knowledge Dissemination: Leveraging UNESCO Resources James Njogu, Joel Ongoto, Mary Kang'ethe, George Eshiamwata, Julius Mwahunga, Angela Muchai, Kenya National Commission for UNESCO

T3.5: Faculty Shortages in Kenya's Expanding Higher Education System: A call to action Daniel Omanyo, Pauline Essah, Lucy Heady, Salome Guchu. IUCEA

	By Mumali A.1, Riungu J.N.1, Kithinji D.K.1, Karanja S.1, Oyoo V.1 <sup>,</sup> Sanitation Research Institute (SRI), Meru University of Science and Technology	
	T2.5: Exclusion and Discrimination in Water Sanitation and Hygiene (WASH) Service Delivery: A case of Mukuru kwa Reuben	
	By Riungu J.N. (Meru University of Science and	
	Technology and Karani C. K Chumo AfricanPopulation and Health Research Centre	

12:45-1:00P.P.M	Plenary		Plenary
100 – 2.00 P.M	Lunch Break		
	Preparing Graduates for the Workforce of Tomorrow Chair: Prof Urbanus Mutwiwa Rapporteurs: Hudson Nandokha; Valeria Onsando	Digital Superhighway and Creative Economy Chair: Dr. Eunice Marete Rapporteur: Dr. Benson Murgor; William Mwangi	<i>Catalyzing the Research Ecosystem</i> Chair: Victor Ogunyo Rapporteur: Angela Nyangera ; Evelyne Okewo
2.00 P.M – 2. 40P.M	Enhancing Postgraduate Training and Supervision for a Thriving Research Ecosystem <b>Speaker: Prof. John K. Chang'ach</b> Deputy Vice Chancellor (ARSA) Alupe University	Building the Digital Superhighway for Africa's Creative Workforce: <b>Speaker: Mr. Nuno Fernandes (Virtual</b> <b>Presentation)</b> <i>President, American Public University System</i> -	Unleashing the Power of Diversity: A Research Agenda for a Secure and Sustainable Energy Future <b>Speaker: Prof. Izael Da Silva</b> <i>Research and Innovation,</i> <i>Strathmore University</i>
2. 40 P.M- 3. 00P.M	Plenary	Plenary	Plenary
3. 00P.M- 3:45 P.M	TRACK 1: PAPER PRESENTATIONS	TRACK 2: PAPER PRESENTATIONS T2:6: Effect of Gum Arabic on Wheat Flour Dough Rheology by	TRACK 3: PAPER PRESENTATIONS T3.6: Protecting the Ecosystem Through Environmental Audit Emerging Issues and Challenges
	Skills Development in Higher Education: Towards Quality Research and Innovation for	Roseline Mwihaki Kiama1, Mary Omwamba1, George Wafula Wanjala2 and Symon Maina Mahungu1 1 Egerton University	in Environmental Auditing: Antony Wafula Wanyonyi, School of

2.450M 44000M	Community Outreach in Kenya: Lessons Learnt from Developed Nations Jacob Lolelea Natae Dr. Stella Kabesa, University of Eldoret T1.7 Charting the course: navigating governance and quality assurance in private and public universities in Kenya. Prof. Maurice Oduor Okoth, University of Eldoret	<ul> <li>T2.7: Adsorption of Lead from Water using Agricultural Wastes, Carbon Nanotubes and Cobalt Ferrite Nanocomposite by Fidelis Ngugi, Tharaka University</li> <li>T2.8: Microcredits as Enabler for Small Enterprise's Foster Achievement of Kenyan Vision 2030 by</li> <li>Prof. Peter Paul Kithae, Management University of Africa</li> <li>T2:9: Risk Factors Associated with Non- Communicable Diseases Burden in Kenya- A Systematic Analysis of Burden of Disease Study For 369 Diseases and Injuries (1990-2019). Josephine Wanjiku Ngunjiri (University of Embu) and Peter Keiyoro (University of Nairobi)</li> </ul>	International Exchange, Nanjing Audit University, China. T3.7: Towards Open Innovation Ecosystems: Leveraging Open Science for Social Transformation Kamuri Mary Wanjiku (Technical University of Kenya)
3:45PM-4:00PM		Plenary	Plenary
4.00P.M – 5.00 P.M	Health Break		
5.00 P.M	Entertainment Gala Dinner Master of Cerem	ony: Prof. Mike Kuria Commision Secretary /CEO Commis	sion for University Education



8.00 A.M - 8.30 A.M.	Arrival of Guests, Registration Entertainment	Conference Secretariat	
8.30 A.M- 8.55 A.M	Bridging the Skills Gap: Global Trends and Strategies for Aligning Higher Education with Workforce Needs		Chair:
	Speaker: Pedro Cerdan-Infantes. The World Ba	FIOI OIDAINUS MULWIWA, DCS ACC.	
8.55 - 9.20 A.M	Building Future-Proof Engineering Graduates: Leveraging Research and Industry		Rapporteurs:
	Collaboration		Claris Adoyo/Pius Walela
	Speaker: Prof. Washington Yotto Ochieng, FR	Eng FIC	
	Dean Engineering, Imperial College of London - (	Virtual Presentation)	
9.20 – 10.00 A.M	Plenary		
	AMPHITHEATRE	IMPALA ROOM	TURKANA ROOM
	Preparing Graduates for the Workforce of Tomorrow	Digital Superhighway and Creative Economy	Catalyzing the Research Ecosystem
	Chair: Prof. Kamau Ngamau, Vice Chancellor of The Co-operative University of Kenya	Chair: Dr. Darius Mogaka Ogutu, Ministry of Education	Chair: Prof. Justus Mile, Vice Chancellor Kiriri Women's University of Science and Technology
	Rapporteurs: Dr. Monica Gachunga	Rapporteur: Angela Nyang'era	Rapporteur: William Mwangi
10.00 A.M- 10:30M	Future Proofing Universities: Preparing Graduates for the Workforce of Tomorrow	From Research Labs to Real- World Impact: Bridging the Gap Between University Research and	Building a Thriving Research Ecosystem in Universities: CUE's Role in Balancing Regulation, Quality
	Speaker: Dr. Elizabeth Johnson	Commercialization	Assurance, and innovation
	Provost, American Public University System	Speaker: Prof. Margaret Hutchinson	Speakers: Prof Urbanus Mutwiwa and Dr. Eunice Marete
		DVC, Research Innovation and Enterprise, University of Nairobi	
10:30-10:45AM	Plenary	Plenary	Plenary

10:45 -11.15A.M.	Health Break				
11.15A.M 11.45	Plenary Session: Monetizing and Commercializing Innovations: Strategies for Startups		Chair: Dr. James K. Ngugi (CUE)		
P.M	and Scale-Ups.		Rapporteurs: Valeria Onsando and		
	Speaker: Philipp Assmus - CEO & Founder of The Factor-Y and CBaaS Speaker: Andre Varma - Partner/Business Development Director		Naftali Okodo		
11:45AM -12:00	Plenary				
PM					
12.00P.M 01:00 P.M.	Research & Innovation Awards		Selected Sponsors		
Closing Ceremony Venue: Main Auditorium					
01:00 P.M-2.00PM	Entertainment	Vice Chancelors Representatives	Chair: Prof. Jackson Too (CUE)		
	Signing of Conference Communiqué	of Education/Commision for	Rapporteurs: Claris Adovo /Angela		
		University Education/Sponsors	Nyang'era		
12.30 P.M-2.00PM	Vote of Thanks	Mr. Joseph Musyoki	Chair: Prof. Jackson Too		
	Official Closing	CEO Prof. Mike Kuria	Rapporteurs: Claris Adoyo /Angela		
		Chair CUE Board Prof. Chacha	Nyang'era		
		Nyaigotti – Chacha,			
		Principal Secretary Dr. Beatrice			
		Inyangala			
	Closing Prayers				
2.00P.M		Lunch/Departure			

# CONFERENCE OBJECTIVES

To **exhibit impactful research** across diverse disciplines, highlighting Kenyan universities' contributions to addressing critical societal challenges;



To *facilitate dialogue and knowledge exchange* between universities, industry, and government stakeholders to drive collaborative research and innovation;



To *benchmark Kenyan universities against international best practices* to identify areas for improvement and inform future-oriented education reforms; and

To promote the dissemination and accessibility of research findings, inspiring the next generation of researchers and innovators.



### COMMISSION FOR UNIVERSITY EDUCATION

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