



4th Annual International ENGINEERING Conference

Dates: 26-27th OCTOBER 2022

Hosted by the Faculty of Engineering

Theme “*Emerging Research and Technologies in Engineering for
Sustainable Development of Society*”

Zoom Link for the Conference

https://us02web.zoom.us/join/tZlqdu-sqTovHdXrW_VeLjhfWGTy2iH7H41K

About the University of Nairobi, Kenya

The University of Nairobi is the oldest University in Kenya with its origins in the Royal Technical College of East Africa, which was established in 1956 to offer education and training in technology and business. Subsequently, the University of Nairobi was established out of the University College, in 1970. From the first 215 students who registered to study in the Royal Technical College of East Africa when it opened its doors to students for the first time on 23rd April 1956, there are today over 50,000 students enrolled. The University has been, and continues to be a centre for intellectual life, a locus of research activity extending the boundaries of knowledge, a resource for professional development, and a key player in the growing global network of scholarship. The University is considered a source of excellence and a leader in new initiatives and innovations in response to national and global needs alike. It is endowed with some of the best and highly rated professors and scholars in Africa who service the University and serve in other Government and institutions locally and internationally. This engagement, creates a difference in the society and its environs. Other notable strengths include a vast base of talented holistic students who leverage on their diversity and different talents to gain competencies in various fields.

Vice-Chancellor's Welcome Remarks



**Prof. Stephen Kiama,
BVM, MSc. (Nairobi), PhD (Bern).
Vice-Chancellor, University of Nairobi**

On behalf of the University of Nairobi and on my own behalf, it is my pleasure to welcome you to the 4th Engineering Conference (EC2022) edition of the Research Week which opens today October 26, 2022. The EC2022 edition of the University of Nairobi Research Week builds on what has been achieved at the AEC2020 which was held in October 2020 jointly between the Faculty of Engineering and that of The Built Environment. The EC2022 CONFERENCE will be based on the theme: *“Emerging Research and Technologies in Engineering for Sustainable Development of Society”*

This theme has provided us with the opportunity to showcase Research and Technologies including entrepreneurship that will involve cross-cutting issues in local, regional and global sustainable development agenda aimed at solving engineering related problems affecting society for improvement of community

livelihoods.

Ladies and gentlemen, this EC2022 is a forum to showcase emerging innovative research areas and technologies and present the same for scrutiny through academic papers while getting useful ideas that would help shape the research direction for societal growth and development. EC2022 is unique as it has also included pre-training workshops scheduled for 24th -25th October 2022 and facilitated by experts in academia aimed at sharpening proposal and scientific writing skills to increase chances of winning research grants and getting papers published in peer reviewed journals. The hands-on training will help researchers (including postgraduate students) at advanced stages in their research publish in reputable peer reviewed journals.

It is my pleasure to be here knowing that EC2022 is a worthy platform for fulfilling the University's Mandate and Mission. We continue to draw great inspiration from ideas that emanate from the various disciplines of Engineering aimed at solving problems afflicting the society.

It is my honour to declare EC2022 open.

God Bless you all.

Message from University of Nairobi Research Week Committee Chairperson



Prof. M. Jesang Hutchinson
Associate Vice- Chancellor
Research, Innovation, and
Enterprise

I take this opportunity to officially welcome you to the 4th Annual International Engineering Conference (EC2022). This year's theme is titled: *“Emerging Research and Technologies in Engineering for Sustainable Development of Society.”*

The faculty, recognized as a centre of excellence in Research and Technology, is hosting the Engineering Conference 2022 (EC2022) which provides a platform for interaction between researchers, practitioners and entrepreneurs in the field of engineering and related fields including nuclear science. The forum endeavors to share current research findings that solve problems in Kenya, Africa and the World at large. The innovative research and technology a key area for researchers at the faculty for sustainable development nationally and in the continent of Africa.

Research development and knowledge production in the thematic areas addressed by the conference have great potential in uplifting Africa's research, science and technology, which are quickly gaining grip in both academic and industrial discussions. We welcome all participants to the University, a destination for both Kenyans and international 'virtual' travelers. We look forward to continuing to build-upon and evolve these research sharing platform efforts in the coming year as we ensure the Conference continues being an annual event. This will be in line with our commitment to produce a community of researchers to develop science, technology and innovation for societal growth and development.

I take note of the fact that the conference has attracted participants locally and globally including participants from South Africa, Nigeria, Rwanda and Germany among others. I also wish to recognize participation of both Academia and Industry as keynote speakers. The conference will indeed provide a forum for interaction to exchange of ideas and knowledge on research, technologies including entrepreneurship for sustainable development of society as envisaged in the research week theme. The 4th Engineering conference will be one among other conferences that will take place during the Research Week hosted by the University of Nairobi during the period 24th – 28th October 2022. Presentation of conference paper is one way of dissemination of knowledge generated from research by staff and postgraduate students. Exhibition of technologies from industry shows application of scientific knowledge in solving societal problems and also contributes to identifying areas where further research may be needed for improvement of technologies for industrial growth and development.

I would also like to thank all the participants from Kenya and different countries represented here. We feel honoured by your attendance. I wish you a very fruitful engagement

God bless you all

Message from the Director, Research and Enterprise



Prof Justus M. Munyoki
Director, Research and
Enterprise
University of Nairobi

This week the University of Nairobi is once again hosting a series of conferences during the University Research Week that runs between 24th and 28th October, 2022. During the Week, we have fourteen conferences cutting across seven Faculties. The theme of this year's Research Week conferences is '**Emerging Research and Technologies for Sustainable Development in Society**'.

This theme is very appropriate in our times as the world is recovering from Covid19 effects, and is a clarion call to all researchers and practitioners to focus on the important role of research and technology towards sustainable development in Society. The conferences have attracted high-quality papers on different topics related to the specific themes of the respective conferences, and I call upon the attendees to actively participate and see what they can learn from the research findings. The Research Week has attracted very eminent Guest Speakers both

local and international, and it will be interesting to listen to their presentations.

I wish to thank our guest speakers, key note speakers, paper presenters, staff, students and all delegates, who have taken time off their busy schedules to all tend our conferences, either physically or virtually. We truly value your time and hope that this is not the last time you are joining us in the conferences. We will continue to collaborate with you and invite you in our future conferences and any other areas where we think your input is needed.

Message from the Dean, Faculty of Engineering



Prof. Ayub Gitau, Dean
Faculty of Engineering

On behalf of the Faculty of Engineering staff and students, University of Nairobi, I take this opportunity to welcome you to the 4th International Engineering Conference (EC2022) scheduled to take place during the University Research Week in the period 24th - 28th September 2022. The theme of this year's conference is "*Emerging Research and Technologies in Engineering for Sustainable Development in Society*". EC2022 is aimed at bringing together the universities and industry with the aim of sharing progress made and recent developments emerging from research, technological development and entrepreneurship. The conference has been organized by the Faculty of Engineering Research Committee, University of Nairobi.

Through presentation of papers, exhibition of products from industry partners, keynote speeches, information on recent advances in research and technology that are expected to shape future research direction and also play a key role in sustainable development of society, information will be shared among the participants who consist of key players in the industry, academia, research organizations, innovators and entrepreneurs. This is to be achieved under themes that fall under various engineering fields that include Civil Engineering, Mechanical and Mechatronics Engineering, Electrical and Information Engineering, Agricultural and Biosystems Engineering and Geospatial Engineering among others. To give the conference a global perspective, the conference has embraced participation from local as well international participants that have come from Eastern, Western and Southern Africa, Europe among others and drawn from the student community, university academic staff, practitioners in industry, government departments, research institutions among others.

The conference will also include pre-training workshops and proposal writing session, a unique feature in the EC2022 aimed at enabling scientific knowledge generated from research be disseminated to help solve real problems in society and thereby contributing to the university mission and meeting stakeholder expectations of partly addressing problems that affect societal development and therefore thereby improving livelihoods. We look forward to a fruitful engagement with all categories of participants and wish to let you know that your contributions will be highly appreciated.

Message/speech from the Conference Committee Chair



On behalf of the Conference organizing committee, Faculty of Engineering, I take this opportunity to welcome you to the 4th Annual International Engineering conference (EC2022) scheduled to take place during the University Research Week 24th-28th October 2022. The theme for this year's conference is "*Emerging Research and Technologies in Engineering for Sustainable Development of Societies*". The conference brings together academics, researchers and Industry practitioners locally and abroad to share information on and exchange ideas on recent development in research and technologies.

Dr. J.P.O Obiero, Conference Committee Chairman

The conference has attracted a total of over 50 presenters locally and internationally and 6 keynote speakers from the industry and academia including overseas institutions. The technical session themes include

Innovations in Technology, Manufacturing and Health, Land Use, Land Cover and Ecosystems, Water Resources and Hydroclimatic Disasters, Agriculture and Food Security, Early Warning and Disaster Preparedness. Two workshops will go together with the main conference. The pre-conference workshop will focus on two themes being Grant Proposal writing and Publication writing scheduled to take place 24th -25th October 2022 and intended to equip the participants with skills in preparing manuscripts with high chances of being published in peer reviewed journal and writing proposals that have high chances of winning research grants. The workshops are to be facilitated by facilitators from the University of Witwatersrand, South Africa and the University of Nairobi, Kenya while the proposal writing workshop is planned to take place 27-28 October 2022 involving joint participation of both the University of Nairobi and University of Kassel Germany through a collaborative agreement targeted at developing a collaborative proposal that focuses on solar energy technology development.

The main conference is to take place on 26th -27th October 2022. Conference presentations will include both academic staff and students drawn from both local and international institution including South Africa, Nigeria, and Rwanda among others. The conference will provide a good opportunity for staff and students to show case their research findings and share research ideas. Through oral presentations, the students will have the opportunity to learn presentation skills early in their career and also develop manuscripts for publications in peer review journals. The keynote speeches are planned to trigger discussions on engineering training, research and practice for sustainable development. The planned workshops and conferences are expected to play a critical role in supporting the University of Nairobi in its vision of being a world class university committed to scholarly excellence.

KEYNOTE SPEAKERS

ENG ARAM M. MBUI



Eng. Aram Mbui is currently the Managing Director of Rift valley Machinery Services Ltd (RVMS). He is a mechanical engineer by profession, a graduate of Mechanical Engineering from the University of Nairobi (1976), an MBA from Strathmore University and a Pan African EMBA module from IESSE Business school Barcelona Spain He has additional qualifications including postgraduate certificates in irrigation and solar water pumping, from The International Irrigation centre, Utah state University (USA) and Strathmore University respectively. He has over 40 years of industrial practice in engineering starting as an employee in government ministry and several international companies before eventually founding his own company, the RVMS. Owing to his vast experience in industry, Eng Mbui has

served in various positions in professional societies and organizations including being elected member of American Society of Agricultural Engineers, The National Chairman Federation of Kenya Employers (FKE), a member of the Board of trustees of FKE. He was elected Chairman of the Kenya Society of Agricultural Engineers, a Director of The Kenya Power & Lighting Co.Ltd as well as a member of Board of Trustees of NSSF. He has served in a number of Boards including the Board of Governors of Kirinyaga Institute of Technology which later became The Kirinyaga University. Eng Mbui has been appointed severally to serve as a Director of The National Industrial Training Authority and was involved in the transitioning of the institution from a Govt Department known as The Directorate of Industrial training to a Parastatal. He went through product training programmes at Perkins Engines Ltd, Peterborough UK, one of the largest Diesel engine manufacturers, Lister - Petter Diesels Ltd, Dursley UK, Robert Bosch Karsuhle Federal Republic of Germany , Caterpillar Inc.Peoria, Illinois USA and at Rome Industries Cedartown Georgia USA. Driven by the urge to be self employed, Eng Mbui founded in 1987, a private Company namely Rift Valley Machinery Services Ltd initially based in Nakuru. The company is mainly involved in the WATER, ENERGY and AGRICULTURAL sectors and is involved in the supply, installation and commissioning of Industrial and Agricultural machinery such as water pumps, Forage making equipment such as choppers and harvesters, Diesel-powered generators (10kva to 1000kva) and Solar water pumping systems. RVMS major clients include among others; farmers, and farmers organizations eg KTDA , educational institutions such as schools and universities, Banks, Saccos NGO's, UN agencies. Since its inception the company has attached over 200 Engineering students of various disciplines including Mechanical, Electrical Civil, Agricultural and Biosystems Engineering. Eng Mbui has played a role in the training of engineers by opening the doors of his company to engineering students and graduates since its inception through industrial attachments and internships as well as employing fresh engineering graduates .Among the notables attachees and later employees of RVMS is the current Chairman of the Agricultural and Biosystems Engineering Faculty at JKUAT Dr Kilonzo. Over the years Eng Mbui has also inspired a number of former employees to start their own companies and a notable one is a former RVMS employee Mary Njue an Engineering graduate of JKUAT who established a firm namely EPICENTRE AFRICA which is involved in the supply and installation of solar water pumping solutions in the E.A region

Prof. Dr. Oliver Jorg Hensel



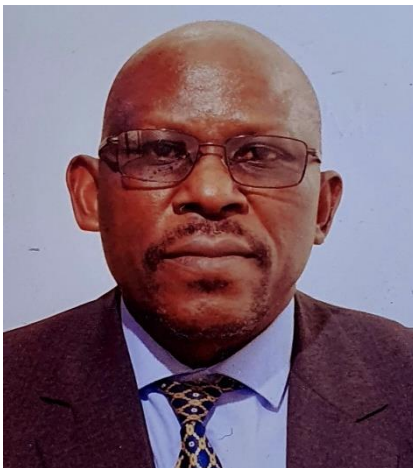
Prof. Dr. Oliver Jorg Hensel is a Full Professor and Head of Department of Agricultural and Biosystems Engineering, Faculty of Organic Agricultural Sciences, University of Kassel, Germany

He is a founder Member of the International Centre for Decent Work and Development – “Higher Education Excellence in Development Co-operation” by DAAD and the German Federal Ministry for Economic Cooperation and Development (BMZ)

He is also Commissioner of partnership to the University of Bogota, Colombia, Coordinator of PostDoc fellowship

programme “Engineering Sciences in Sub-Saharan Africa” by Volkswagen Foundation“ Dr. Hensel is an expert in Biosystems Engineering, Renewable Energy, Agricultural Machinery, Irrigation, Rural Development, Electronical Sensors for Farm Implements.

Eng (Prof.) Moses O. Marenya



Moses O. Marenya is an associate professor in the School of Chemical and Biological Systems Engineering at the Technical University of Kenya. His current work encompasses teaching and research in food and bioprocess engineering, the headship of the food and bioprocess engineering thematic area, academic and research administration, mentoring of junior staff, research, management and community engagement. He holds BSc and MSc degrees from the University of Nairobi and a PhD from the University of Pretoria, all in agricultural engineering. Prof. Marenya is a registered professional engineer in Kenya and South Africa. He is a Fellow of the South Africa Institute of Agricultural Engineers (SAIAE), a Member of the Kenya Society of Environmental, Biological and Agricultural Engineers

(KeSEBAE), and a former member of the American Society of Agricultural and Biological Engineers (ASABE). He has considerable experience in engineering education, industry, research, engineering curriculum, assessment and evaluation, professional development of graduate engineers and development of professional registration processes, strategies and policies. Prof. Marenya has served and continues to serve the Engineering Council of South Africa (ECSA) and the SAIAE in several capacities.

Margaret Wangui



Margaret Kuchio is the General Manager, Branches DAVIS & SHIRTLIFF LTD, Nairobi, Kenya. She Holds a Bachelor of Science degree in Agricultural Engineering from the University of Nairobi. She started her career as a Sales Engineer with Davis and Shirliff and rose through the ranks to become the current General Manager in charge of the Branch Network in Kenya. Along her career path she also served as the Nairobi Westlands BranchManager and thereafter as Sales Manager at the Head Office along Dundori Road in Nairobi. Margaret Kuchio has mentored many young graduate engineers from her vast experience in the

application of engineering to solving problems affecting society. She is currently giving oversight to

the *Women-in-Leadership* mentorship program recently launched in Davis & Shirtliff. She is married, a mother of two, and is very passionate about education of the girl child, women in science and leadership.

Byron Anangwe



Byron ANANGWE is the Business Development Manager ESRI Eastern Africa. He is passionate about developing solutions and applications in Geo-ICT (Geo-Information Communication Technologies) towards the sustainable development of Africa. He is a keen advocate of engaging with communities to increase social impacts of technologydriven initiatives.

Byron has more than 20 years of experience in application of Earth Observation & Geo-Information Sciences in Sub Sahara Africa (SSA). His areas of interest are in application, training and policy development in sectors Agriculture, Blue Economy, Climate Action, Energy, Environment, Economics, Land Management and Health with specific interests in Natural Resource Management (NRM). Byron is an alumnus of Manchester Metropolitan University – UK and the Technical University of Kenya. He currently serves an advisor to government and private sector on matters relating to harnessing of the Space Economy for National Development as well as the Business Development Manager at Esri Eastern Africa (www.esriea.com)

E-mail – banangwe@esriea.com

Conference Organizing Committee:

Dr John P. O. Obiero, Chairman, EC2022 Conference Committee and
Co-ordinator (Agricultural and Biosystems Engineering)

Prof. George O. Rading, Co-ordinator (Mechanical and Mechatronics Engineering)

Prof. John Bosco K. Kiema, Co-ordinator (Geospatial Engineering)

Dr. Siphila M. Mumanya, Co-ordinator (Civil Engineering)

Dr. Davis Segera, Co-ordinator (Electrical and Information Engineering)

Mr Michael Mangala, Co-ordinator (Nuclear Science)

PROGRAMME

WEDNESDAY 26th October 2022

Time	Activities	Session paper Author /Session Chair
8:30-9:30 am	Opening Ceremony 1) Committee Chair 2) Dean: Faculty of Engineering 3) Opening remarks-AVC RIE 4) Vice Chancellor	Master of Ceremony:
Time	Innovations in Technology, Manufacturing and Health Session Chair: Prof. George O. Rading	
9.30 – 9.40am	Assessment of indoor background ionizing radiation levels in premises located in western Kenya <hr/> Authors: Phillip Einstein Ogola, Mathew Piero Ngugi, Siphila Mumenya Wanjiku, Richard Okoth Oduor.	
9.40 – 9.50.00am	Characterization of organo-clays produced from Kenyan bentonite <hr/> Authors: T.O Mbuya, K D Njoroge, F M Mwema and K Mutonga	
9.50.00 – 10.00am	An investigation of the fatigue properties of the aluminium-copper alloy 2014 <hr/> Authors: Alfred Muchangi	
10.00 – 10.10am	Characterization of Kenyan Quarry Dust for Use as Reinforcement for Waste Plastics. <hr/> Authors: Johnson Ngugi, George O. Rading, Thomas O. Mbuya	
10.10 – 10.20am	A performance-based approach for design of concrete mixes <hr/> Authors: Gladwell W. Nganga, Siphila W. Mumenya, Silvester O. Abuodha, Thomas O. Mbuya	
10.20 – 10.30 am	A study into the effectiveness of a ground-based electromagnetic launcher for the purposes of development of a technology demonstrator <hr/> Authors: Stower, G.T.1, Suerin, V.1, Mwongera, V. M.	
10.30 – 11.00 am	HEALTH BREAK	

11.00 – 11.10am	Hybrid Wild Dog-Grey Wolf Optimizer for use in Electromagnetic Optimization Problems Wellington Akelo, Davies Segera, Abraham Nyete	
11.10 – 11.20am	Development of an automatic tomato paste production machine Olanrewaju, T. O., Durojaiye, L., Sunusi, I.I., Tenuche, S. S. and Baba Dahiru	
11.20 – 11.30am	User clustering in hybrid noma systems using excited binary grey wolf optimization Wendy A. Ouko, Abraham Nyete, Davies Segera	
11:30 – 11:45 pm	Keynote Address: Rift Valley Machinery Services	Eng. Aram M. Mbui, Managing Director, Rift Valley Machinery Services
11:45 – 12:00 pm	Q&A SESSION	
12:00 – 12.15 pm	Keynote Address: Davis and Shirliff Ltd	Margaret Kuchio, General Manager, Davis and Shirliff Ltd
12:15 – 12.30 pm	Q&A SESSION	
12.30 – 12.45 pm	Keynote Address: National Commission for Science, Technology & Innovation (NACOSTI)	Prof. Walter O. Oyawa Director General, NACOSTI
12.45 – 13.00 pm	Q&A SESSION	
	LUNCH BREAK	
Time	Innovations in Technology, Manufacturing and Health – cont. Session Chair: Dr. Siphila M. Mumenya	
2:00-2.10pm	Partial replacement with Glass Muthomi Munyua, Oscar Juma	
2.10 – 2.20	Mathematical modelling of the hot air drying and infrared assisted hot air drying of beef biltong F. C. Muga, T. S. Workneh, and M. O. Marenya	
2.20 – 2.30	Comparative Analysis of Structural Steel and Reinforced Concrete Construction for Sustainable Development Kaaria Dyna Gakii, Siphila Mumenya, Sylvester Abuodha	
2.30 – 2.40	Selection and characterization of rumen microorganisms for anaerobic digestion of typha biomass N A Sale, R A Kohn, T O Olanrewaju, S I Idris	
2.40 – 2.50	Investigation of the Mechanical Properties and Consistency of Concrete with Different Dosages of Fibre Mesh Kembe, N., Munyua, M.	
2.50 – 3.00	Comparative Analysis of Performance of a Forced Convection Solar Dryer for Tomato with Open-Sun drying System	

3.00 – 3.10	Fagge, A.A., T.O. Olanrewaju., G.N. Ugama, M.U. Makeri Characteristics of cinder gravel as road pavement construction material in Meru County, Kenya. Wilson Kipsang Kosgey, Sixtus Kinyua Mwea, Osano Simpson Nyambane
3.10 – 3.20	Evaluation of the Performance of Pavement Founded on the Reinforced Earth Sections along Outer Ring Road, Nairobi Kirima Doreen Kiende, S.K. Mwea,S.N. Osano
3.20 – 3.30	Modular construction in Kenya Ammon Korir, Ezekiel Oduor, Linus Murage, Jerry Okoth
3.30 – 3.40	Investigation into the Effect of Rice Husk Ash in Partial Replacement of Cement in Concrete John Alex Muthuri Njagi , Barrack Omondi Okoya, Muthomi Munyua
3.40 – 3.50	Innovative algorithm for synchroverter control of grid stability with diverse energy manifestations due to integration of res/der/ev battery storage infrastructure Lucy Patricia Onundo
3.50 – 4.00	Assessment of Factors Influencing Construction and Demolition Waste Management Practices in Kenya: Towards a Circular Economy Modelled Sustainable Waste Management Framework in Kenya Stephen Nyakondo, Muthumbi Waweru
4.00 – 4.10	A review of the performance-based specifications for pavement construction P. Wanyama, S.N. Osano
4.10 – 4.20	Analysis of Environmental Effects in Solar PV mini-grid using homer software Lincon Ndwiga Muriuki, Duncan Onyango Mbuge, Peter Musau Moses
4.20 – 4.40	HEALTH BREAK
END OF DAY ONE	

Thursday 27th October 2022

Time	Land Use, Land Cover and Ecosystems Session Chair: Prof. John B. K. Kiema
8:30 – 8.40 am	Prediction of Sediment Yield for Kases Dam Catchment Area in West Pokot County Muchira Gitu Joseph, John P. O. Obiero
8.40 – 8.50 am	Assessing Climate Variability in Wajir County using Remote Sensing Maryan Sheikh, J.B.K Kiema
8.50 – 9.00 am	Using GIS to Assess Sustainability of Urban Development in Nakuru City as One of Kenya's Emerging Cities Kariuki, J.W., Kiema, J.B.K.

9.00 – 9.10 am	<p>Assessment of Land Use Land Cover Change and Its Implications on Agricultural Land: Case Study; Kiminini Sub- County in Trans Nzoia County, Kenya</p> <hr/> <p>Chepkwony Titus Kipkoech, Musyoka Sammy Mulei</p>
9.10 – 9.20 am	<p>Insights from Tracking 30 Years of Change in Lower Eastern Kenya’s Agro Ecologies</p> <hr/> <p>Lilian Ndungu, J.B.K. Kiema, D. Siriba, Denis Macharia, Samuel Wamathai</p>
9.20 – 9.30 am	<p>Environmental Radon Exposure and Personal Occupational Exposure Levels Assessment in Soapstone Mines, Tabaka Area, Kisii County</p> <hr/> <p>Linnet K. Nyamweya, Geoffrey O. Okeng’o, Michael Mangala</p>
9.30 – 9.40 am	<p>A Study on the Impacts of radiological hazards from sand mining and geothermal exploration in the Menengai Caldera, Nakuru County, Kenya</p> <hr/> <p>Ruth O. Achieng, Geoffrey O. Okengó , Michael J. Mangala</p>
9.40 – 9.50 am	<p>Using GIS for site suitability analysis for locating a radio telescope in Kenya</p> <hr/> <p>Ochieng Francis Omondi, Musyoka Sammy Mulei</p>
9.50 – 10.00 am	<p>Assessing the effectiveness of land resource management practices on erosion and vegetative cover using GIS and remote sensing techniques in Chepareria watershed, West Pokot County, Kenya</p> <hr/> <p>Serah Lemurt</p>
10.00 – 10.10 am	<p>Assessment of impact of land use/land cover change on hydrological processes in kibwezi watershed</p> <hr/> <p>Reuben C. Ruttoh, John P. O. Obiero, Christian T. Omuto, Lucas Tanui</p>
10.10 – 10.20 am	<p>Application of UAV- LIDAR system in forest inventory; a case study of Mombasa Bamburi cement forest</p> <hr/> <p>Ngure Felix Wachira, Musyoka Sammy Mulei</p>
10.20 – 10.30 am	<p>Analysis of the impact of land use change of Kiega forest on Thanantu river flow using remote sensing and GIS</p> <hr/> <p>Grace Waithira Mwangi, John PO Obiero, Christian T. Omuto</p>
10.30 – 10.40 am	<p>Cadastral Data Integration Using Linked Data Approach (Case Study: Ngong area of Kajiado land registry)</p> <hr/> <p>Amos Kiptui Komen, Collins Mwangi</p>
10.40 – 11.00 am	HEALTH BREAK
	<p>Water Resources and Hydroclimatic Disasters</p> <p>Session Chair: Dr John P.O Obiero</p>

11.10 – 11.10am	Hydrologic and Socio-economic Assessment of Urban Rainwater Harvesting: A Case Study of Nairobi City	
	Stephen W. Auma, John P.O Obiero	
11.10 – 11.20 am	Assessment of the Impact of Floods on Available Essential Trace Elements in Soils and Selected Food Crops grown in Budalangi Area, Busia County	
	Anvar Joseph Alot, Geoffrey O. Okeng'o, Michael Mangala	
11.20 – 11.30	Hydrological Modeling for Flood Risk Analysis in selected Sub-Counties, Nairobi, Kenya	
	Maureen A. Mulungo, John P. O. Obiero, Christian T. Omuto	
11:30am -12 pm	Keynote Address: Technical University of Kenya	Leader: Eng (Prof.) Moses O. Marenya Associate Professor, School of Chemical and Biological Systems Engineering, Faculty of Engineering and The Built Environment, Technical University of Kenya
	<i>Q&A SESSION</i>	
12.00 – 12.30	Keynote Address: University of Kassel Germany, Campus Witzenhausen, Germany	Leader: Prof. Oliver Hensel, Full professor and head of the Department of Agricultural and Biosystems Engineering, University of Kassel, Campus Witzenhausen, Germany
	<i>Q&A SESSION</i>	
12.30 – 1.00 pm	Keynote Address: ESRI Eastern Africa	Leader: Byron Anangwe Business Development Manager ESRI Eastern Africa
	<i>Q&A SESSION</i>	
2:00-3:30 pm	Water Resources and Hydroclimatic Disasters - cont Session Chair : Dr John PO Obiero	
2.00 – 2.10 pm	Evaluation of the purifying capacity of microalgae-based pre-treatment system for industrial wastewater	
	Kimari Genevieve Wamaitha, John PO Obiero, Peter K Ndiba	
2.10 – 2.20 pm	Mapping Soil Erodibility Factor in the Maruba Dam Reservoir Catchment, Machakos, Kenya	
	Allois Luvai, John Obiero, Christian Omuto	
2.20 – 2.30 pm	Developing a water allocation planning model for a Kenyan sub catchment: a case study of Awach Tende sub-catchment.	
	Mibey JM, Omuto CT, Obiero JPO	
	Agriculture and Food Security Session Chair: Mr. Michael Mangala	

2.30 – 2.40	Small-scale Crop Mapping using Artificial Intelligence and Machine Learning Gerald C. K. Chelelgo, John P. O. Obiero, Faith N. Karanja
2.40 – 2.50	Tractor-Implement Piezoelectric Energy Harvester for Multi-Resonant Draft Vibrations in Tillage - A Short communication on a proposed state of art study Frankline Mwititi, Ayub Gitau, Duncan Mbuge
2.50 – 3.00	Opportunities for optimizing agriculture and climate adaptation: A modelled Case Study for Lower Eastern Kenya Lilian Ndungu, J.B.K. Kiema, Ing. D. Siriba, Denis Macharia, Samuel Wamathai
3.00 – 3.10	Analysis of land suitability for avocado farming a case study of Kericho County Chebet, B, Kiema, J.B.K.
3.10 – 3.20 pm	Use of Geospatial data in enhancing Crop Production: Status of Kenyan Counties
3.20 – 3.30 pm	Anastasia Wahome, J.B.K. Kiema, G.C. Mulaku Design, construction and evaluation of an indirect solar dryer for drying mangoes Mbedzi CM, Hobyani VA, Siamsipa MF, Muga FC, and M. O. Marenya
3.30 – 3.40 pm	Baseline survey on current level of mechanization and ware potato cultivation and the labour-intensive activity in ware potato production chain at Nyandarua county Martin M. Nanje, Ayub N. Gitau, Duncan O. Mbunge
	Early Warning and Disaster Preparedness Session Chair: Mr Michael Mangala
3.40 – 3.50 pm	Predicting Displacement Effects of Tectonic Movements on the Kenyan Geodetic Reference Frame Network (KENREF) Sammy M. Matara, David N. Siriba, John B.K. Kiema , and Sammy M. Musyoka
3.50 – 4.00 pm	Forest Fire Vulnerability Assessment in the Aberdare Forest Reserve Using GIS Ndegwa, J.M, Kiema, J.B.K
4.00 – 4.10 pm	Evaluation of Trace Elements' Concentrations in Nails of Esophageal and Stomach Cancer Patients: As an Early Diagnostic Screening Tool Owili Nancy, David K. Kariuki, Michael J. Gatari.
4.10 - 4:30 pm	<i>Plenary Session: Interactive Student Session</i> <i>Research and Publications</i> Session Chair: Dr. Davies Segera
4.30 – 4.45 pm	Health Break
4:45– 5.00pm	<i>Feedback Collection</i> <i>Closing Ceremony</i>