



THE TECHNICAL UNIVERSITY OF KENYA

Haile Selassie Avenue, P.O. Box 52428, Nairobi, 00200, Tel +254(020) 343672, 2249974, 2251300, 341639

Fax 2219689, Email: vc@tukenya.ac.ke, Website: www.tukenya.ac.ke

NAME: DR JOHN MWAI MBUGUA

Faculty:	Social Sciences and Technology
School:	Center for Science and Technology Studies
Department:	Science and Technology in Society
Current Designation:	Lecturer, DEPARTMENT OF CHEMISTRY AND MATERIALS SCIENCE
Office Telephone:	+254753212802
Official Email:	jmmwai@gmail.com
Consultation Hours:	*weekdays 11am -1pm



EDUCATION

LEVEL	QUALIFICATION NAME	INSTITUTION	YEAR
Doctor of Philosophy (PhD)	CHEMISTRY	University of Kwazulu_Natal(South Africa)	2013
Masters of Science (M.Sc.)	CHEMISTRY	JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY(Kenya)	2006
Bachelor of Education (B.Ed)	SCIENCE	KENYATTA UNIVERSITY(Kenya)	1995
O level/Equivalent	KENYA CERTIFICATE OF SECONDARY EDUCATION	Starehe Boy's Centre and School(Kenya)	1989
KCPE/Equivalent	KENYA CERTIFICATE OF PRIMARY EDUCATION	Kinale(Kenya)	1985

WORK EXPERIENCE

PERIOD	INSTITUTION	POSITION
2013 - Todate	Technical University of Kenya (TUK)	Lecturer
Jan 2013 - June 2013	UJ	Undergraduate Demonstrator
2009 - 2012	UKZN	Undergraduate Demonstrator
2005 - 2012	Kenya Polytechnic/Kenya Polytechnic University College	Lecturer
1995 - 2003	Njiiris High School	Graduate Teacher

GENERAL STATEMENT ON RESEARCH AREAS

To investigate,model and understand the Science associated with the chemical and hydraulic interaction of brine and organics with ash dams and heaps during their co-disposal.

Modeling water-brines -coal ash interactions and studying reactions and transformations when in contact with inorganics and organics

Other Areas of Research Interests: • Water and Sanitation Research: water quality, pollutants control and mitigation, innovation of waste management systems and design, Faecal sludge analysis and utilization in agriculture as fertilizer • Biochemical methods designs and development for solid and water waste systems & Bio-remediation • Contaminated Sites Investigation, Assessment, Mitigation, Remediation and Post-Remediation Site Analysis and Audits

CURRENT RESEARCH PROJECTS

Hydrogeochemical modeling of the speciation and leaching of fly ash co-disposed with water, brines,and organics

Hydro-geochemical modeling of Environmental systems: Analytical-Environmental Chemistry

Development of Flow Injection-Hydride Generation-Phase Separation Interfaces for the Determination of Arsenic in Natural Waters and Rice Using Atomic Absorption Spectrometry

Analytical-Environmental Chemistry

SELECTED PUBLICATIONS

TITLE	LINK TO PUBLICATION	YEAR
13th May 2019: Book Published; Book's ISBN-13 (978-3-330-03983-4): ISBN-10 (3330039833); Hydrogeochemical Modeling of the Speciation and Leaching of Fly Ash Co-Disposed with Water, Brines and Organics: A Case Study of Sasol-Eskom Coal Ash Disposal, South Africa;	View online	
Mbugua, J.M., Ngila, J. C., Kindness, Demlie, M. Reactive-transport modeling of fly ash-water-brines interactions from laboratory-scale column studies, J. Phys. Chem. Earth (2013). http://dx.doi.org/10.1016/j.pce.2013.09.016	View online	
Bosire, G. O., Ngila, J. C., Mbugua, J. M. (2015). "Predictive complexation models of the impact of natural organic matter and cations on scaling in cooling water pipes: a case study of power generation plants in South Africa." Physics and Chemistry of the Earth, Parts A/B/C(0). http://dx.doi.org/10.1016/j.pce.2014.11.007	View online	
• Mbugua, J.M., Ngila, J. C., Kindness, A., Demlie, M. Application of Hydrogeochemical Modeling in Simulating the Transportation of Elements in Fly Ash Heap under Different Disposal Systems in South Africa. J. Phys. Chem. Earth (2014), p. 20. http://dx.doi.org/10.1016/j.pce.2014.11.011	View online	
Kirumba, G., Thumbi, G., Mwang, J., Mbugua, J. Analysis of the Sludge Settling Behavior of the Kibendera Waste Stabilization Ponds in Ruiru, Kenya, Journal of Energy, Environmental & Chemical Engineering. Vol. 8, No. 1, 2023, pp. 18-25. doi:10.11648/j.jeece.20230801.13. https://www.sciencepublishinggroup.com/article/10.11648/j.jeece.20230801.13	View online	2023
Kirumba, G., Thumbi, G., Mwangi, J., Mbugua, J. (2024). Modelling Nitrogen Removal in the Kibendera Wastewater Stabilization Ponds in Ruiru, Kenya. Applied Engineering, 8(1), 1-13. https://doi.org/10.11648/j.ae.20240801.11	View online	2024
Kirumba, G., Thumbi, G., Mwang, J., Mbugua, J. Evaluation of Sewage Treatment Efficiency of a Two-Stage Floating Wetland System. International Journal of Environmental Protection and Policy. Vol. 10, No. 5, 2022, pp. 122-129. doi: 10.11648/j.ijepp.20221005.12 : http://www.sciencepublishinggroup.com/j/ijepp	View online	2022
Kirumba, G., Thumbi, G., Mwang, J., Mbugua, J. Evaluation Of Sewage Treatment Efficiency of The Kibendera Waste Stabilization Ponds In Ruiru, Kenya: Journal Of International Academic Research For Multidisciplinary, Issn: 2320-5083, Volume 10, Issue 8, October 2022: https://www.jiarm.com/	View online	2022

POSTGRADUATE STUDENTS SUPERVISION

NAME	PROJECT TITLE	PERIOD
Bosire Geoffrey Orina	Multivariate Analysis and Modeling Studies of Stability Constants of Ca and Mg-NOM Complexes in Cool	2013- 2016 Graduated with PhD.
GEORGE CHIRA KIRUMBA (REG.: EECX/02699P/2018)	Experimental and Modeling Studies for Domestic Wastewater Treatment: A Case Study of the Kibendera Waste Stabilization Ponds In Ruiru, Kenya.	2021-Ongoing

COURSES TAUGHT

NAME	DESCRIPTION	PERIOD
Environmental Impact Assessment and Audit (EIA): B,Tech Industrial Chemistry Environmental Chemistry: B,Tech Industrial Chemistry Chemistry A: Bachelors (Engineering students) Physical Chemistry: Diploma-Biochemistry class Laboratory Practice II: Diploma Applied Analytical Chemistry, Volumetric Anal	Previously, and Currently teaching the above listed courses	May 2021 and June 2021 - TO-DATE
Industrial Waste Management	Purpose of Course The course is intended to empower the student with the knowledge of the Sources, Analysis and Treatment of Industrial effluents and exposes the student with the various standard levels (National and International Toxic Limit Levels) of effluent components used for impact assessment.	May-August 2022 - TO-DATE
Green Chemistry	Master of Technology (Applied Chemistry)	May 2025 - TO-DATE

PROFESSIONAL AFFILIATIONS AND SOCIETIES

TITLE	INSTITUTION
Post Doctoral Qualification	University of Johannesburg (UJ)
Doctoral Qualification	University of Kwa Zulu Natal (UKZN)
MSc Qualification	JKUAT
BEd.Science Chemistry/Maths	KU

EXTRA INFORMATION

DESCRIPTION

Affiliation :
Member of Kenya Chemical Society (KCS)

UNIVERSITY: POSTDOCTORAL:

Jan 2013-June 2013 : University of Johannesburg; Department of Applied Chemistry, Johannesburg, South Africa

(Activities and Outcomes)

- i. Involved in writing three journal paper manuscripts, two of them have been published in JCPE Elsevier journal and one is under review
- ii. Got trained and gained competence in the usage of SEM, XRD and ICP-MS & ICP-OES Instruments.
- iii. Participated in the training of the ESKOM staff and UJ postgraduates in hydrogeochemical modeling using PHREEQC and VISUAL MINTEQ.
- iv. Modeling of the Eskom coal processing industrial cooling water and Ca/Mg complexation with NOMs to reduce scaling.
- v. Participated in teaching undergraduates and mentoring postgraduate students of UJ.
- vi. Assessment of environmental pollution of fresh water bodies and municipal wastes in Johannesburg, South Africa.

Duties and Responsibilities at Technical University of Kenya (TUK)

- Ø Lecturer (Analytical -Environmental Chemistry)
- Ø Course Tutor
- Ø Member of DCST Postgraduate Studies Academic Review Committee
- Ø Head of Departmental Thematic area; Environmental Chemistry
- Ø Acting DCST Chairman (April-May 2015)
- Ø Committee member: TUK Conferences and Workshops-Research and Knowledge Exchange Directorate (2017-2018).
- Ø Committee Member: TUK ENVIRONMENTAL COMMITTEE (2022- To date)

CONFERENCES/SEMINARS/WORKSHOPS

TRAINING WORKSHOPS

1. **November 18- 22, 2019; - Attended a Workshop Training on use of Constructed Wetlands Technology for wastewater treatment, held in Mombasa Kenya, at Kenya Marine and Fisheries Research Institute (KeMFRI). Organised and funded by** Western Indian Ocean Marine Science Association-(WIOMSA) in collaboration with the UN-Nairobi Convention. Awarded Certificate of attendance.
2. **November 14, 2018; - Attended a Refresher Course workshop on EIA in Nairobi University, Upper Kabete Campus. Organized and funded by** Environmental Institute of Kenya (EIK). Awarded Certificate of attendance.
3. **February 25- 26, 2016; - Attended a workshop Training on Ecological Risk Assessment, held in Nairobi, Kenya. Organized and funded by** IUPAC, CropLife and TUK. Awarded Certificate of attendance.
4. **29th October 2015- Attended a Stakeholders Workshop for Curriculum Program Development for Multimedia University (BSc. Industrial Chemistry).**
5. **16-18 May 2011- Attended a short course Training workshop on Geochemistry and Contaminant Transport Modelling, held in Cape Town, South Africa. Awarded Certificate of attendance. This greatly enhanced my hydrogeochemical modelling skills and competency.**
6. **June 14- 16, 2005; - Attended a GENSTAT Workshop Training on Data Analysis from Experiments; Organized and Sponsored by VSN International, in Nairobi Kenya. Awarded Certificate of attendance**

CONFERENCES/SEMINARS

1. **Organized and attended The 3rd TU-K International Conference on INNOVATIVE TECHNOLOGIES FOR DEVELOPMENT: Held on 23rd to 25th February 2016, Laico Hotel Nairobi, Kenya. Organized by TUK.**
2. **John M. Mbugua, J. Catherine Ngila, Chris Buckley, Andrew Kindness, Demlie Molla, *Application Of Hydrogeochemical Modeling In Simulating The Transportation Of Elements In Fly Ash Heap Under Different Disposal Systems In South Africa, Oral presentation in 14th WaterNet /WARFSA/GWP-SA Symposium-Transboundary Water Cooperation:Building Partnerships, Dar es Salaam, Tanzania, 29th-2nd October, 2013.***
7. **John M. Mbugua, J. Catherine Ngila, Chris Buckley, Andrew Kindness, Demlie Molla, Shameer Hareeparsad. *Hydrogeochemical modeling of fly ash co-disposed with brines: Effect of brines on acid neutralization capacity of a South African fly ash.* Poster presentation in 2nd Tanzania Chemical Society International Conference proceedings, Dar es Salaam, Tanzania, October 5-7, 2011.**
8. **John M. Mbugua, J. Catherine Ngila, Chris Buckley, Andrew Kindness, Demlie Molla. *Hydrogeochemical modeling of multi-species release and transport in fly ash-brine co-disposal systems, using PHREEQC. Poster presentation during Faculty of Science and Agriculture Research day, Pietermaritzburg, South Africa, September 23rd 2010.***

OUTREACH, CONSULTANCIES, BOARD MEMBERSHIPS

Consultancies: Besides academia I have been involved in consultancy work (through a Lead Firm of Experts: ENVIGLOBAL CONSULTANTS LIMITED) relating to Environmental Impact Assessment and Audit, Health and Safety Audit, Modelling environmental systems; Water systems and Water-related issues and Analysis as well as Solid Waste management.

Outreach: Member of Lari Resource Trust whose aim is to promote the welfare of Lari sub county through mobilization of active community and leadership engagement, towards optimal productivity in the various social and economic spheres of Lari Constituency

Board Membership:

2017 - To date: BOM Chairman - UTUGI SECONDARY SCHOOL in Lari sub county

2014-2016 :BOM Vice Chairman -UTUGI SECONDARY SCHOOL in Lari sub county

Application Letter for promotion and review of my grade