

## CURRICULUM VITAE

### **Dr. Khaemba W. Alexander**

C/o Civil and Structural Engineering Department  
Masinde Muliro University of Science and Technology (MMUST)  
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**Nationality:** Kenyan  
**Languages:** English, Kiswahili, Luhya, German  
**Date of Birth:** 7<sup>th</sup> May 1973  
**Marital Status:** Married  
**Profession:** Surveyor/Lecturer/Researcher  
**Organization:** Masinde Muliro University of Science and Technology (MMUST)  
**Position:** Senior Lecturer in Civil & Structural Engineering Department

### SPECIALIZATION

**Specialty Fields:** Surveying, Geographical Information Systems (GIS), Photogrammetry and Remote Sensing.

**Experience:** Planning and execution of engineering Survey works involving provision of horizontal and vertical controls. GPS traversing, precise levelling and topographical mapping.

Design and implementation of internet web mapping services using ESRI and Intergraph technologies embracing Open GIS Consortium standards. Developing GIS analysis procedures to locate environmental hazards, Landuse zonation and protection areas.

Lecturing in Engineering Surveying, GIS, Photogrammetry and Remote Sensing. Supervision of, undergraduate and postgraduate students. Organization of specialized workshops and short training courses. Curriculum review and development. Research in GIS and Remote Sensing applications in Natural Resource Utilization, crime mapping and disaster engineering and management.

### ACADEMIC QUALIFICATIONS

<b>School/College/University</b>	<b>Period</b>	<b>Qualifications</b>
Bungoma High School	1988 – 1991	K.C.S.E
University of Nairobi	1993 – 1998	B. Sc. (Surveying)
Stuttgart University of Applied Sciences	2002 – 2004	M. Sc. (Geoinformatics)
Moi University	2008 – 2012	PhD (E.M.P&M)

## **WORK EXPERIENCE**

### **May 2012 – date: Masinde Muliro University of Science and Technology (MMUST).**

Senior Lecturer in the department of Civil and Structural Engineering. Responsibilities include:

- Teaching Undergraduate and Postgraduate students in Engineering Surveying, Geographical Information Systems (GIS), Remote Sensing and Photogrammetry
- Supervision of postgraduate students in the conduct of research and writing of thesis
- Development of curriculum for new courses and review of existing ones
- Organization of faculty workshops and short training courses
- Faculty representative to the board of Directorate of International Linkages
- Faculty Examinations and Timetabling Coordinator
- Departmental Coordinator of Industrial Attachment for Civil & Structural Engineering students

### **April 2005 – April 2012: Masinde Muliro University of Science and Technology (MMUST).**

Lecturer in the department of Civil and Structural Engineering. Responsibilities included:

- Teaching Undergraduate in Engineering Surveying, Geographical Information Systems (GIS), Remote Sensing and Photogrammetry
- Development of curriculum for new courses
- Faculty representative to the board of Directorate of International Linkages
- Departmental Coordinator of workshops & training

**July 2016 – date:** External Examiner in the department of Geomatic Engineering and Geospatial Engineering at Jomo Kenyatta University of Agriculture and Technology.

### **2004–2005 Jomo Kenyatta University of Agriculture & Technology.**

Assistant Lecturer in department of Geomatic Engineering and Geospatial Information Systems (GEGIS). Taught undergraduate courses in GIS and Remote Sensing, Surveying and Photogrammetry.

### **2003–2004 Wirtschaftsförderung region Stuttgart GMBH:**

Was involved in the setting up of an internet GIS application for the above authority (**Stuttgart Region Economic Development Corporation**) of the state of Baden-Württemberg, Germany. The internet map service based on ESRI technology was implemented to deliver maps through the intranet/internet seamlessly.

### **1999 – 2002 Geomaps Africa**

As a surveyor with Geomaps I worked on the following projects:

#### ***Kenya Urban transport Infrastructure project:***

In this project which involved photogrammetric mapping for the purpose of road inventory and condition survey of 26 municipal towns including Nairobi, Mombasa, Kisumu and Nakuru, while working with Geomaps Africa for the ministry of Local government, I participated in GPS surveying, field editing and office completion of the topo-cadastral maps using Microstation. I was also involved in the structuring of the GIS data using ArcView.

#### ***Nyayo Tea Zones Improvement and Forest conservation project:***

Working with Geomaps Africa for Nyayo Tea Development Corporation, I participated in the planning and execution of ground control for the purpose of photogrammetric mapping of the Nyayo Tea zones

surrounding all the indigenous forests in the country. GPS was used for ground control. I was also involved in the office completion of the maps using microstation and prepared GIS data using ArcView.

**Engineering surveys:**

As lead surveyor, I participated in the topographical survey of Jomo Kenyatta University College of Agriculture and Technology (JKUAT) for the project “African Institute for Capacity Development” covering an approximate area of 16 hectares on behalf of Pacific Consultants International-Japan.

As a lead Surveyor I coordinated and carried out route surveys for pipeline alignment for the Kenya Pipeline Company for the purposes of producing digital maps of the pipeline. This project covered Nakuru, Eldoret and Kisumu towns. The maps were prepared using Microstation and ArcView.

**PROJECT/ THESES TITLES**

**1. Title of B. Sc. Project:** An Investigation into the effect of gravity on Geodetic Leveling

**Institution:** The Department of Surveying, University of Nairobi

**Area:** Engineering Surveying

**Year:** November 1998

*The report involved an assessment of the effect of gravity on precise levelling along a section of the National Geodetic Levelling network consisting of three lines each joining fundamental benchmarks. The lines adopted in this project were Mau Summit – Kisumu, Kisumu – Webuye and Webuye – Eldoret.*

**2. Title of M. Sc. Thesis:** Conception and Design of a GIS Portal that Combines Different Web Map Services

**Institution:** The Department of Geomatics, Stuttgart University of Applied Sciences, Germany

**Area:** Internet GIS

**Year:** March, 2004

*The task of this thesis was to implement a GIS portal that combines different web map services into a single client. This takes advantage of OpenGIS web map service specifications that enable portal clients to dynamically access, query and combine different types of spatial information over the web from distributed map servers developed by diverse companies and organizations. These map servers, must comply with the OpenGIS Specifications.*

**3. Title of PhD. Thesis:** Optimization of Urban Land Use Planning: The Case of Kisumu Municipality

**Institution:** The Department of Environmental Information Systems, Moi University.

**Area:** Applied GIS and Remote Sensing

**Year:** 2012

*This research developed a spatial framework for urban land use planning using multi-criteria/multi-objective decision support systems for Kisumu municipality. The study sought to establish and recommend the kind of spatial land use model that urban planners can use as a planning tool for the provision of utilities and services with the aim of fostering sustainable development. Both spatial and non-spatial data was analysed systematically through criteria formulation, multi-criteria evaluation and multi-objective land allocation processes to derive spatial land use information.*

## **RESEARCH INTERESTS**

- 1) GIS and Remote Sensing applications in Landuse mapping
- 2) GIS applications in crime Mapping
- 3) GIS and Remote Sensing applications in Natural Disaster Management

## **EXTERNAL EXAMINATION**

Appointed external examiner to the department of Geomatic Engineering and Geospatial Information Systems of Jomo Kenyatta University of agriculture and Technology from July 2016 – July 2020.

## **POSTGRADUATE SUPERVISION**

### **Masters Students**

1. *Students Name:* Maloba Joseck  
*Title of Research:* Effects of Increased Land Use Changes on Runoff and Sediment Yield in the Upper River Nzoia Catchment.  
*Status:* Graduated 2017
2. *Students Name:* Celcus Murenjekha Shilehwa  
*Title of Research:* Optimization of Reservoir Pressure for Management of Water Losses in distribution Network: Case of Kimilili Water Supply Scheme, Kenya  
*Status:* Graduated 2019
3. *Students Name:* Hudson Makhanu  
*Title of Research:* Establishing the impacts of climate change and land use variables change on future water availability in Bungoma County  
*Status:* Ongoing

### **PhD Students**

1. *Students Name:* Anna Ingaita Muganda – CSE/H/01-53158/2018  
*Title of Research:* Modelling of a Piano Key Weir under extreme flow conditions  
*Status:* Ongoing

## **PROFESSIONAL AFFILIATION**

Full Member of the Institution of Surveyors of Kenya (I.S.K).

## **UNIVERSITY FUNDING**

As a Senior Lecturer, Successfully wrote a proposal to the Germany Academic Exchange Service (DAAD) to facilitate setting up of a Geographical Information Systems (GIS) laboratory at the University. Equipment worth Ksh 2.3 Million was delivered to the University on 10<sup>th</sup> June 2014. These included 15 PC computers, 1 laptop, 7 GPS receivers, 1 scanner, 1 A3 size printer and ArcGIS 10.2 software.

## **PARTICIPATION IN UNIVERSITY PROJECTS**

### **25<sup>th</sup> – 27<sup>th</sup> July 2012**

Involved in the organization and training of about 40 selected Masters students from Moi University, Maseno University, Masinde Muliro University of Science and Technology and private sector, on Research Proposal Writing. The workshop was organized by the MMUST chapter of Kenya DAAD Scholars Association and jointly funded by Germany Academic Exchange Service (DAAD) and the National Council of Science and Technology.

### **5<sup>th</sup> -15<sup>th</sup> August 2013**

Organizing and running the programme on Short Intensive Courses on Innovative Projects in Renewable Energy for Sustainable Development organized by Masinde Muliro University of Science and Technology in collaboration with Kisii University, Helsinki Metropolia University of Applied Sciences-Finland and Makerere University-Uganda. The training of about 25 students drawn from MMUST, Makerere and Metropolia University was in three main topics in Biofuels, Photovoltaics and Solar Thermal Energy.

### **August 2012 – August 2015**

Completed a joint project about “Streamlining GIS Teaching while emphasizing Regional Focus”. A German-Ugandan-Kenyan University cooperation between Karlsruhe University of Applied Sciences (HSKA) – Germany, Masinde Muliro University of Science and Technology (MMUST), Kenya and Makerere University (MAK), Uganda with funding from Germany Academic exchange Service (DAAD). The project was based on subject-related partnerships with institutions of higher education in developing countries. Main focus was on developing teaching materials, practical exercises and Instructor slides for three GIS modules.

## **COMMUNITY PARTICIPATION**

- Chairman, Board of Management, St. Teresa’s Kabula Secondary School
- Vice Chairman, Board of Management, St. Joseph’s Academy
- Member of Church Development Committee of St Joseph’s Cathedral Catholic Church Kakamega.

## **PAPERS AT NATIONAL / INTERNATIONAL CONFERENCES**

Khaemba W. A. (2003), “Integrating Web Map Services- OGC standards”, paper presented at the Commission IV Joint Workshop on Challenges in Geospatial Analysis, Integration and Visualization. Stuttgart, Germany, September, 2003

Khaemba W. A. (2004), “Design of web Map Portal Services”, paper presented at the 5<sup>th</sup> Conference of the African Association of Remote Sensing of the Environment (AARSE) Nairobi, October 2005.

Mburu, N., Khaemba, A.W, and Waweru, S.G., “Environmental hazards in the developing countries”, paper presented at the Conference on Disaster Preparedness for a safer world at Masinde Muliro University, Kakamega, October 2006.

Khaemba W. A. (2006), “Geo-information for Sustainable Natural Resource Utilization” presented at the DAAD Regional conference on Environmental Sustainability. Nairobi, December 2006.

Khaemba W. A. (2010), “Image Fusion Techniques for Land Use Mapping Using Landsat ETM+ Satellite Imagery” presented at the 1<sup>st</sup> Engineering Conference on Science and Technology for Engineering Innovation and Sustainable Industrialization. MMUST, Kakamega, June 2010.

Khaemba W. A. (2011), “Geoinformation Techniques as an Aid To Urban Land Use Planning: The Case of Kisumu Municipality” presented at the 4<sup>th</sup> AGSE International Conference on Geoinformation for a better life. JKUAT, August 2011.

Khaemba W. A. (2013), “Urban Landuse Suitability Assessment Using GIS Techniques for Sustainable Development” presented at the 1<sup>st</sup> Conference on Environmental Monitoring Research Science and Technology for Sustainable Development in Kenya and the Impact on the National Vision 2030. Technical University of Kenya, Nairobi. 9<sup>th</sup> -12<sup>th</sup> April, 2013.

## **PUBLICATIONS**

1. Kettemann, R., Khaemba, W. A. (2004) “Interoperable portal services”, in Intergraph’s Mapping and Geospatial Solutions International Journal, April 2004 issue.
2. Kettemann, R., Khaemba, W. A. (2004) “Conception and design of a GIS Portal that combines different web map services”, in engineering journal of Baden-Württemberg.
3. Onyacha, C., Khaemba, W.A., and Sabuni, B.(2008) “ Geographic Information System Application in Artificial Groundwater Recharge : Case Study of Kilifi District in the Kenyan Coast. Journal of Science Technology Education and Management (JSTEM) Vol 2 Nos 1&2.
4. Khaemba, W. A., and Mwasi, B. (2010). “ Image Fusion Techniques for Land Use Mapping Using Landsat ETM+ Satellite Imagery, for Kisumu Municipality, Kenya. Journal of Geomatics, Vol 4 No.2
5. Onyacha, C., Khaemba, W.A., and Sabuni, B.(2010). “Aquifer Storage and Recovery and Surface Basins for a Greener Kilifi District. Nile Water Science & Engineering Journal. Vol 3 Issue 3.
6. Khaemba, W.A., Mwasi, B., and Opata, P. G. (2012). “Urban Land Use Suitability Assessment Using Geoinformation Techniques for Kisumu Municipality in Kenya: International Journal of Research and Reviews in Applied Sciences. Vol 13, Issue 2.
7. Khaemba, W.A., Mwasi, B., and Opata, G.(2013). “Optimization of Urban Landuse Planning Using Geoinformation Techniques: The case of Kisumu Municipality. East Africa Journal of Engineering, Science and Technogy. Vol 1. No 2.
8. Gaya, C. O., Ong’or B.T.I., and Khaemba. W.A. (2013). “Automation of Field Survey Data Acquisition for GIS: A case of Kenya”. East Africa Journal of Engineering, Science and Technology. Vol 1. No 2.
9. Maloba,J., Khaemba,A., Mburu N., and Akali, M.(2016). “Effects of increased land use changes on runoff and sediment yield in the upper river nzoia catchment”. International Journal of Civil Engineering and Technology (IJCET).
10. Book Published: Optimization of Urban Landuse Planning Using Geoinformation Techniques(2016) by Lap Lambert Academic Publishing [https://www.morebooks.de/gb/p\\_978-3-659-93151-2](https://www.morebooks.de/gb/p_978-3-659-93151-2). ISBN NO: 978-3-659-93151-2.

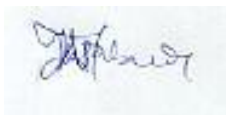
11. Shilehwa,M, C., Sibilike Khamala Makhanu, S.K., and Khameba,W.A (2019). “Application of Artificial Neural Network Model in forecasting water demand: Case of Kimilili Water Supply Scheme, Kenya.” International Journal of Civil Engineering (IJCE).
12. Shilehwa,M, C., Sibilike Khamala Makhanu, S.K., and Khameba,W.A (2019). Management of water losses in Water Supply Distribution Networks through optimization of reservoir pressure: Case of Kimilili Water Supply Scheme, Kenya. ICASTOR Journal of Engineering.

**REFEREES**

1. Dr. Micah Mukolwe.  
CoD, Dept of Civil & Structural Engineering  
Masinde Muliro University College of Science and Technology,  
Box 190 kakamega.  
Tel: +254 720669488
2. Dr. Benardette Sabuni  
Dean, School of Engineering and Built Environment  
Masinde Muliro University College of Science and Technology,  
Box 190 kakamega.  
Tel: +254 722272292
3. Prof. Richard Onchiri Ocharo  
Dean, Faculty of Civil Engineering  
Technical University of Mombasa,  
Tel: +254 724372704

**Certification**

I, the undersigned certify that these data correctly describe me, my qualifications and my experience



Signature of staff member .....Date ...4<sup>th</sup> January 2021

Full Name of staff member: **KHAEMBA WABWOBA ALEXANDER**