

**UNIVERSITY OF NAIROBI**  
**COLLEGE OF BIOLOGICAL AND**  
**PHYSICAL SCIENCES**  
**SCHOOL OF PHYSICAL SCIENCES**

**ANNUAL REPORT 2012**

**SCHOOL OF PHYSICAL SCIENCES ANNUAL REPORT**

## 1.0 INTRODUCTION

The School of Physical Sciences (SPS) is located at Chiromo Campus. It is composed of the following departments of Chemistry, Geography and Environmental Studies, Geology, Meteorology and Physics. The department of Geography and Environmental Studies is however housed at the main Campus for administrative reasons. The School offers several programmes that cater for the changing needs of the society. The Departments have fully equipped individual laboratories and libraries for teaching and research. The School has high expertise in all science disciplines. The School is home to innovations, discoveries and new knowledge. Distinguished researchers mentor students with a view to imparting expertise in scientific research. Further information regarding the activities of the School may be found from the various websites of the component departments of the School of Physical Sciences. The School is headed by a Dean, an elective post.

## 2.0 PROGRAMMES OFFERED

Through the a fore said departments, the School offers the following programmes :

### ❖ DEANS OFFICE

#### **Programmes offered;**

<b>Programme</b>
BSc. Science (I20)
B.Sc. Science (I20 M3)

*[The students take courses from all the departments and schools in the College].*

### ❖ DEPARTMENT OF CHEMISTRY

#### **Programmes offered;**

<b>Programme</b>
BSc Chemistry
BSc. Analytical Chemistry
BSc. Industrial Chemistry
MSc. Analytical Chemistry
MSc. Chemistry
MSc. Environmental Chemistry
MSc Organic Chemistry
MSc Inorganic Chemistry
MSc. Industrial Chemistry
PhD Chemistry
<b>Service Courses to:</b>
<ol style="list-style-type: none"> <li>1. College of Health Sciences (School of Pharmacy),</li> <li>2. College of Architecture and Engineering (Mechanical and Manufacturing Engineering, Civil and Construction Engineering, Environmental and Biosystems Engineering) and</li> <li>3. College of Agriculture and Veterinary Sciences (Food Science and Technology, Agriculture)</li> <li>4. College of Education (B.Ed Science)</li> </ol>
In addition to day programmes, the Department is offering module II evening programs at both the undergraduate and post-graduate levels and also Module 3M by Distance Learning.

❖ **DEPARTMENT OF GEOLOGY**

**Programmes offered;**

<b>Programme</b>
BSc. Geology
BSc. Environmental Geoscience
Msc. Geology
MSc. Geology (Mineralogy & Petrology)
MSc. Geology (Mineral and Geothermal Resources)
MSc. Geology (Environmental Geology and Management)
MSc. Geology (Engineering Geology)
MSc. Geology (Hydrogeology & Groundwater Resource Management)
MSc. Geology (Petroleum Geology)
MSc. Geology (Marine Geology & Resources)
MSc. Geology (Applied Geochemistry)
MSc. Geology (Applied Geophysics)
MSc. Geology (Seismology)
MSc. Geology (Palynology and Micropalaeontology)
MSc. Geology (Mineral Exploration)
PGD Natural and Environmental Disaster Management
PhD Geology

## ❖ DEPARTMENT OF METEOROLOGY

### Programmes offered

<b>Programme</b>
BSc. (Atmospheric Science-I20)
BSc.Meteorology
PDG Meteorology
PGD Aviation Meteorology
PGD Operational Hydrology
MSc. Meteorology
MSc. Climate Change
MSc. Aviation Meteorology
MSc. Agrometeorology
PhD Meteorology

## ❖ DEPARTMENT OF PHYSICS

<b>Programme</b>
BSc. Microprocessor Technology and Instrumentation
BSc. Astronomy and Astrophysics
MSc. Physics
PhD Physics

### 3.0 ENROLLED STUDENTS IN UNDERGRADUATE AND POSTGRADUATE PROGRAMMES

The School has the following enrollments at various levels through the following departments;

❖ **DEANS OFFICE**

Number of Students admitted into each undergraduate programme

<b>Degree Programme</b>	<b>M</b>	<b>F</b>	<b>Total</b>
I20-BACHELOR OF SCIENCE	406	179	<b>585</b>
I20M3-BACHELOR OF SCIENCE	5	0	<b>5</b>
<b>TOTAL</b>	<b>411</b>	<b>179</b>	<b>590</b>

❖ **DEPARTMENT OF CHEMISTRY**

**NUMBER OF STUDENTS ADMITTED INTO EACH UNDERGRADUATE PROGRAMME**

<b>Programme</b>	<b>M</b>	<b>F</b>	<b>Total</b>
I08-B.SC. (INDUSTRIAL CHEMISTRY)	109	40	<b>149</b>
I08M3-B.SC. (INDUSTRIAL CHEMISTRY)	5	1	<b>6</b>
I14-BSC. ANALYTICAL CHEMISTRY	15	6	<b>21</b>
I14M3-BSC. ANALYTICAL CHEMISTRY	1	0	<b>1</b>
<b>TOTAL</b>	<b>130</b>	<b>47</b>	<b>177</b>

BSc. Chemistry students are accounted in Bachelor of Science in the Dean's Office.

**NO. OF STUDENTS ADMITTED INTO EACH POSTGRADUATE PROGRAMME**

<b>PROGRAMME</b>	<b>NUMBER M</b>	<b>F</b>	<b>Total</b>
M.Sc. Chemistry	27	17	<b>44</b>

M.Sc. in Environmental Chemistry	11	7	<b>18</b>
M.Sc. in Analytical Chemistry	9	4	<b>13</b>
M.Sc. in Industrial Chemistry	2	1	<b>3</b>
M.Sc. in Organic Chemistry	-	-	-
M.Sc. in Inorganic Chemistry	-	-	-
Ph.D.	6	8	<b>14</b>
<b>TOTAL</b>	<b>55</b>	<b>37</b>	<b>92</b>

#### ❖ DEPARTMENT OF GEOLOGY

#### STUDENTS IN UNDERGRADUATE AND POSTGRADUATE PROGRAMMES

	Total No. of Students		Module I		Module 2	
	Male	Female	Male	Female	Male	Female
<b>BSc. Geology</b>						
1 <sup>st</sup> Year	40	13	34	11	6	2
2 <sup>nd</sup> Year	21	12	20	9	1	2
3 <sup>rd</sup> Year	32	11	31	11	1	0
4 <sup>th</sup> Year	26	10	24	10	2	0
<b>MSc. Geology</b>						
Year 1	4	0				
Year 2	8	3				
Ph.D	1	3				

#### INTERNATIONAL STUDENT COMPONENT

##### B.Sc. Geology

- |                   |                        |
|-------------------|------------------------|
| 1. I13/57051/2012 | ABEDNEGO MANYIEL MAKER |
| 2. I13/52542/2012 | ATHIAN DEE SANTOS      |
| 3. I13/40244/2011 | DENG JACOB JOK         |
| 4. I20/1920/2012  | ELEMAN ZAIKO SIMON     |
| 5. I13/29906/2009 | KET JAMES MADUTWAL     |
| 6. I13/40076/2011 | SHARIFF NAIMA AWO      |

7. I13/29805/2009

WANTLO NGGIE

**Postgraduate – MSc. Geology**

1. I56/69084/2011

DUO LAWRENCE BHOLLAI

2. I56/70141/2011

NKYA ABRAHAM TUMSIFU

**Postgraduate Diploma – Environmental and Natural Disaster Management**

1. I48/68952/2011

TINASHE MASIMBE

**❖ DEPARTMENT OF METEOROLOGY**

**(a) Undergraduate Programmes**

No	Category/ Programme	Year of study	Female	Male	Total
1	BSc in Meteorology	1	13	39	<b>52</b>
2	BSc in Meteorology	2	9	36	<b>45</b>
3	BSc in Meteorology	3	13	43	<b>56</b>
4	BSc in Meteorology	4	17	41	<b>58</b>
<b>TOTAL</b>			<b>52</b>	<b>159</b>	<b>211</b>

No	Category/ Programme	Group	Year of study	Female	Male	Total
1	BSc in Meteorology (ODL)	1 K	1	2	7	<b>9</b>
2	BSc in Meteorology (ODL)	3J	2	4	3	<b>7</b>
3	BSc (Atmospheric Science)	N/A	1	2	9	<b>11</b>
<b>TOTAL</b>				<b>8</b>	<b>19</b>	<b>27</b>

**(b) Postgraduate Programmes**

No	Category/ Programme	Year of study	Female	Male	Total
1	PGD in Meteorology	1	3	14	<b>17</b>
2	PGD in Aviation Meteorology	1	1	1	<b>2</b>
3	MSc in Meteorology	1	1	4	<b>5</b>
4	MSc in Meteorology	2	2	2	<b>4</b>
5	MSc in Aviation Meteorology	1	0	1	<b>1</b>



6	MSc in Climate Change	1	6	9	<b>15</b>
7	MSc in Climate Change (ODL)	1	0	5	<b>5</b>
8	MSc in Agrometeorology	2	1	2	<b>3</b>
9	PhD in Meteorology	1	1	5	<b>6</b>
10	PhD in Meteorology	2	1	2	<b>3</b>
11	PhD in Meteorology	3	0	4	<b>4</b>
<b>TOTAL</b>			<b>16</b>	<b>49</b>	<b>65</b>

### ❖ International Student Component

#### Distribution of Student Population by Country

No	Country	Number of Students	
		Undergraduate	Postgraduate
1	Botswana	3	0
2	Liberia	0	1
3	Namibia	5	1
4	République du Congo	1	0
5	Rwanda	7	1
6	Tanzania	3	17
7	Uganda	0	1
8	Zambia	1	0
<b>Total</b>		<b>20</b>	<b>21</b>

#### Details of Foreign Students

S/No	FULL NAMES	REG. NUMBER	GENDER	COUNTRY OF ORIGIN	PROGRAMME REGISTERED	PERIOD OF STUDY
1	<b>Sabiiti</b> Geoffrey	I80/80585/2010	Male	Uganda	PhD (Meteorology)	2009-2013
2	<b>Gahigi</b> Aimable	I56/62101/2011	Male	Rwanda	MSc (Agrometeorology)	2010-2012
3	<b>Ashipala</b> Sarafia Ndapandula	I56/71911/2011	Female	Namibia	MSc (Agrometeorology)	2011-2013
4	<b>Mulbah Jr.</b> David Mawolo	I54/76311/2012	Male	Liberia	MSc (Climate Change)	2012-2014
5	<b>Ame</b> Hassan Khatib	I45/80695/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
6	<b>Athuman</b> Ahmed	I45/84333/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
7	<b>Binda</b> Juma Hamisi	I45/84338/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
8	<b>Emmanuel</b> Johnson L.	I45/84341/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
9	<b>Jecha</b> Suleiman Haji	I45/84344/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
10	<b>Kapakala</b> Isaya	I45/80695/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
11	<b>Kasenga</b> Leonard Michael	I45/84347/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
12	<b>Kavishe</b> golden M.	I45/84340/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
13	<b>Levira</b> Pamela william	I45/84350/2012	Female	Tanzania	PGD (Meteorology)	2012-2013
14	<b>Miraji</b> miraji khamis	I45/84342/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
15	<b>Mking'imule</b> Veronica	I571/84348/201	Female	Tanzania	PGD (Meteorology)	2012-2013

		2				
16	Mohamed H. Mohamed	I45/84346/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
17	Musiba Musiba M.	I45/84334/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
18	Mwakilembe Amani Burton	I45/84343/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
19	Nkuba Abel M.	I45/84335/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
20	Tuju Peter Enos	I45/84345/2012	Male	Tanzania	PGD (Meteorology)	2012-2013
21	Tunsume Gideon M.	I45/84339/2012	Female	Tanzania	PGD (Meteorology)	2012-2013
22	Kaligirwa Jeanne	I10/30762/2011	Female	Rwanda	BSc (Meteorology)	2010-2013
23	Nyiranteziryayo Esperance	I10/30922/2011	Female	Rwanda	BSc (Meteorology)	2010-2013
24	Ngabonziza Athanase	I10/30763/2011	Male	Rwanda	BSc (Meteorology)	2010-2013
25	Mbati Mathieu Mugunga	I10/30921/2011	Male	Rwanda	BSc (Meteorology)	2010-2013
26	Odillo Usile Kgobetsi	I10/44542/2012	Male	Namibia	BSc (Meteorology)	2011-2014
27	Sebastiano D.J. Laurinda	I10/44561/2012	Female	Namibia	BSc (Meteorology)	2011-2014
28	Masaka Hendrick	I10/44562/2012	Male	Namibia	BSc (Meteorology)	2011-2014
29	Somses Sieglinde	I10/44543/2012	Female	Namibia	BSc (Meteorology)	2011-2014
30	Haindongo Israel Ndaendako	I10/42366/2011	Male	Namibia	BSc (Meteorology)	2011-2014
31	Anande Doreen Mwara	I10/41650/2011	Female	Tanzania	BSc (Meteorology)	2011-2014
32	Nsonga Joseph	I10/41025/2011	Male	République du Congo	BSc (Meteorology)	2011-2014
33	Gakomati Justin	I10/44407/2012	Male	Rwanda	BSc (Meteorology)	2011-2014
34	Musayidizi Jean De Dieu	I10/44409/2012	Male	Rwanda	BSc (Meteorology)	2011-2014
35	Niyonkuru Shadrack	I10/44408/2012	Male	Rwanda	BSc (Meteorology)	2011-2014
36	Kitero Beatrice Staford	I10/58731/2012	Female	Tanzania	BSc (Meteorology)	2012-2015
37	Maswe Oratile Kelebemang	I10/30949/2013	Female	Botswana	BSc (Meteorology)	2012-2015
38	Moreri Linky	I10/30950/2013	Female	Botswana	BSc (Meteorology)	2012-2015
39	Setoto Joyce Mmapotong	I10/30951/2013	Female	Botswana	BSc (Meteorology)	2012-2015
40	Masigani Godbless John	I10/58733/2012	Male	Tanzania	BSc (Meteorology)	2012-2015
41	Nasilele Collins		Male	Zambia	BSc (Meteorology)	2012-2015

## ❖ DEPARTMENT OF PHYSICS

Number of Students admitted into each undergraduate programme

Programme	M	F	Total
I39-B.SC (MICROPROCESSOR TECHNOLOGY & INSTRUMENTATION)	99	13	112
I44-B.SC. IN ASTRONOMY AND ASTROPHYSICS	60	8	68
<b>Total</b>	<b>159</b>	<b>21</b>	<b>180</b>

Number of Students admitted into each Postgraduate programme

<b>Programme</b>	<b>M</b>	<b>F</b>	<b>Total</b>
MSc. Physics	15	4	19
PhD Physics	12	1	13
<b>Total</b>	<b>27</b>	<b>5</b>	<b>32</b>

BSc. Physics (274) students are accounted for in Bachelor of Science in the Dean's Office.

#### **International Student Component**

- 1 international student enrolled for M.Sc.

#### **4.0 RESEARCH ACTIVITIES UNDERTAKEN**

The School undertakes the following research activities through the following departments:

##### **❖ DEPARTMENT OF CHEMISTRY**

##### **Ongoing Postgraduate research projects (M.Sc)**

<b>NAME</b>	<b>TITLE</b>	<b>SUPERVISORS</b>
Kerandi, Anne Moraa I56/76301/09	Investigation on Genotoxicity of Solar Disinfected (SODIS) Water.	Prof Wandiga
Pembere, Anthony M I56/77607/09	Investigation of Heavy Metals in Vegetables Grown in the Agricultural and Industrial Areas of Webuye and Mumias	Prof Jumba, Dr Oduor

Okanga, Boventure. I56/60505/09	Determination of the Alcoholic Content of Various Spirits: Denatured and Udenatured Among Selected Small Scale Production Units with Respect to Excise Legislation in Kenya	Dr Benson Wamalwa
Njogu, Rachael. I56/77605/09	Investigation of Leaf Nutrient Uptake of Camellia Sinensis in the Eastern and Western Highlands of Kenya Following Foliar and Compound Fertilizer (NPK) Application	Dr Kariuki and Dr D.M. Kamau (TRFK)
Karani, Christopher I56/60531/10	Industrial Production of Sodium Hydroxide and Chlorine Gas from locally available Materials	Prof Kamau
Kavivi, Lynnette I56/60282/09	Use of Homology Modelling in the Development of the G-Coupled Protein Receptor of the Migratory Locust. Use of Homology Modelling in the Development of the G-Coupled Protein Receptor of the Migratory Locust.	Dr Damaris Mbui
Riungu, Emily I56/60538/10	Municipal Wastewater Treatment with Anodizing Solid Waste	Dr H. Njenga and Prof L. Njenga
Kathambu Muriithi I56/78601/09	Bioassay Guided Characterization of Rheumatic Principles from Cyperus Articulatus (Ndago) Plant	Prof Midiwo and Prof Abiy

Fredrick Mzee Mwazighe I56/60158/2010	“Physico-chemical characterization of chamomile extract and stability monitoring of the extract”.	Prof Kamau, Dr Mwaniki
Tonkei, Wilson I56/77606/09	Development of an Electrochemical Sensor for the Detection of Heavy Metals in Waste Water.	Dr Aluoch Prof Shiundu
Mr. Dennis Ndaya	Biodiesel production from <i>Calodendrum capense</i> seeds: Process design and technological assessment	Dr John Onyari Prof Shiundu P.M. Dr James Nyangaya Prof F. Mulaa
Mr. Evans Nangulu	GIS clustering and mapping pollution from industries within nairobi	Dr Aluoch Austin Dr Martin Marani
Mr. Murimi J. Mbugua.	To improve on lead acid battery manufacture in a more environmental friendly manner	Prof Kamau G. Dr Guto P.
Ms. Judith Ngugi Joseph	Chemical analysis of borehole and shallow well water in arid and semi-arid regions of kenya.	Prof Lydia Njenga Dr Kithinji J.P.
Mr. Wanyonyi Peter Namutala	Electroanalytical determination of trace metals using stripping voltammetry technique	
Mr. Rael Obong’o Kasera	Determination of effectiveness of untreated and edta-treated luffa cylindrica in removal of $cr^{3+}$ and $cu^{2+}$ from waste water.	Prof Shiundu P.M. Dr Austin Aluoch

Ndiritu, Cecilia W.	Mobility of Heavy Metals, Microorganisms and Hydrodynamics of a Section of Nairobi River	Prof Kamau G. Prof Mwaura, Dr Kithinji J.P.
Kundu, Bevin N.	Comparison of Burning effectiveness of Liquid Biofuels and their Blends with Kerosene as Alternative Fuel for Lighting and Cooking	Dr Onyari J.M. Dr Kithinji J.P.
Masenge, Edna M.	Total Petroleum Hydrocarbons in Sediments and Water in Ngong and Mathare River	Prof Wandiga S.O. Prof Shiundu P.M.
Muya, Catherine N.	Electrocatalytic Decomposition of Organochlorine Pollutants	Prof G. Kamau Dr Peterson Guto
Everlyne Kasima N.	Efficiency of Kipevu treatment works, Mombasa	Dr A.O. Yusuf Dr D.K. Kariuki Dr D. Abong'o
Mbewa, Tom Joseph	Heavy Metal Analysis of Thermoplastic Paints in the Kenyan Market and the Environmental Implications of Application as road Marking Paints	Prof Kamau G. Dr F. Oduor Dr Kariuki D.K.
Ogange, Elphas O.	The Role of Fertilizer Usage and Agrochemical Effluents on the Persistence of Algae Bloom on Kenyan Shores of Lake Victoria	Dr F. Oduor Dr Kariuki D.K.

Wanyama, George N.	An Account of the Phyto-Bioconcentration of Copper in the Control of <i>Eichhornia Crasspies</i> (Water Hyacinth)	Prof Jumba I.O. Dr Oduor F.D.
Murimi, John Mbugua	An Alternative Metal/Electrolyte for Lead Acid Battery Making	Prof Kamau G. Dr Guto Peterson
Awas, Erick Okoth I56/63685/10	A Comparative Study of the Toxicity, Protective and Cell Defense Induction Capacity of Flavones from Kenyan Plants and Lipophilic Semi-Synthetic Derivatives	Prof Midiwo, Dr Mwaniki and Ndakala
Njeru, Daisy Nyawira I56/63228/10	Phytochemical Investigation of the Root of <i>Desmodium Ramosissimum</i> for Antiplasmodial Principles	Dr Derese and Prof Abiy
Mugo, Fredrick Muriithi I56/63877/10	Total Element Speciation and Soil Fertility Analysis Around Mt. Kenya	Prof Njenga L.
Ogalo, Linet I56/65065/10	Use of Electro-Analytic Methods in the Development of Biosensor for Detection of Bisphenol A.	Dr Mbui D.
Everlyne Kasima I56/60282/08	Effectiveness of the Kipevu Treatment Works	Dr A. Yusuf , Dr. D.K. Kariuki, Dr D. Abongo
Ochieng, Fredrick Nyateng I56/64713/10	Assessment of pesticide and polychlorinated biphenyls residue Levels in Fish from	Prof Wandiga S.

	Kericho and Upper Nyando of River Nyando drainage basin in Kenya	
Oyagi, Moses Ondabu I56/64280/10	Synthesis of Silver Nanoparticles at Room Temperature using Tea Extracts from Terminal Bud and Two Adjacent Leaves.	Prof Kamau G.
Muraga, Joseph I56/77605/09	Determination of Dissolved Ions and Microbial Coliforms in Ground Water in Selected Areas in Athi River Basin	Prof Wandiga S.
Katithi David I56/65092/10	Green Synthesis and Characterization of Iron Nanoparticles using Aqueous Sorghum Bran Extracts and their Application in Environmental Remediation.	Prof Kamau G.
Marube Elijah I56/63820/10	Application of Cleaner Production Techniques in Leather Industries in Kenya	Prof Kamau G.
Makokha, John Wanjala I56/64538/10	Utilization of Titanium Oxide in formulation of Refractory Clay Bricks	Dr Kariuki D.K.
Victor Nthusi Kyalo I56/63840/10	Assessment of Organochlorine, PCB,s and Organophosphate Pesticide Residues in Fish from Lower Nyando Drainage Basin	Prof Wandiga S.



### Ongoing Postgraduate research projects (Ph.D)

<b>NAME</b>	<b>TITLE</b>	<b>SUPERVISORS</b>
Madadi O. Vincent	Studies of pesticide and macronutrient interaction dynamics in water-sediment/soil systems	Prof. Shem O. Wandiga Prof. Paul M. Shiundu
Godfrey A. Wafula	A Study of atmospheric fine particulate matter and their toxic components in Nairobi and its environs	Prof. Shem O. Wandiga Prof. Paul M. Shiundu
C.W. Mirikau	A computerized model for the identification and location of water polluting industries in Nairobi	Prof. G.N. Kamau Prof. I.O. Jumba
Mrs. Marina Mukabi		Prof. Duke Orata Dr. Austin Ochieng'
Ms. Joyce G. Njagi-Kithure	Distribution of diazinon and chlorpyrifos in selected aquatic matrices from the upper Tana River in Kenya	Prof. S.O. Wandiga Prof. I.O. Jumba
Mrs. Ruth Odhiambo	Synthesis of bionucleating macrocycles incorporating thiolato and polyether compounds fused to 1,10-phananthroline as sensors for soft heavy metal	Prof. S.O. Wandiga Dr. Austin Ochieng'
Farida Hussein Were	Assessment of levels of selected heavy metals and their effects on the health of industrial health workers in Nairobi and Athi River, Kenya	Prof. Geoffrey Kamau Prof. P.M. Shiundu Dr. C.M. Muturi
Immaculate Achieng'	Evaluating the efficacy of selected lignocellulosic materials	Prof. P.M. Shiundu

	of Kenyan origin in the adsorption of textile dyes and inks from aqueous industrial effluents	Dr. A. Aluoch Dr. B. Wamalwa
Beatrice Irungu	Bioprospecting for antiplasmodial compounds from some albizia, turea and zanthoylum species in Kenya	Prof. Abiy Yenesew

❖ **DEPARTMENT OF GEOLOGY**

**RESEARCH ACTIVITIES UNDERTAKEN**

1. East African Great Lakes Observatory (EAGLO)-Ecosystem Services for Poverty Alleviation (ESPA) : From November 1, 2010 – October 21, 2012 – Prof. E. Odada
2. Equatorial Africa Atmospheric Deposition Network (EADN) : From April 2010 – March 2014 Headed by: Prof. E. Odada.
3. Suguta Valley Project – Palaeoclimatology and Palaeolimnology of the Suguta Valley, Kenya. In Collaboration with Prof. Dr. Martin Trauth, University of Potsdam, Germany: 2007 – 2010.
4. Mapping the Health Impacts of Geogenic Heavy Metal Pollution in Kilifi District: Policy Regulation and Remediation: 2012 – 2014. Dr. L. Olaka
5. January 2012 to January 2013. TECLEA – Testing Biodiversity Responses to Climate and Land-use Changes Across East African Highlands – Prof. D.O. Olago
6. December 2010 to December 2014. Building Climate Change Adaptation Capacity at African Universities: A Proposal to Establish The Climate Adaptation Research Institute (CARI) at the University of Nairobi - Prof. D. O. Olago
7. CTBTO PROJECT PERIOD COVERED: 2002- Ongoing: Monitoring of nuclear explosions and seismicity using the CTBTO stations PS24 and IS32 – Prof. N.O. Akech

8. IAEA PROJECT CODE: RAF 8048 - PERIOD COVERED: 2009-2013 : Building Capacity in Support of Regional and Sub Regional Water Resources Planning, Development and Management in Africa – Prof. N.O. Akech
9. PERIOD COVERED: 2013-2017 - Integrating isotope hydrology into water resources assessment for the upcoming Lamu Port Infrastructure in the Lower Tana River catchment (Lamu and Tana delta); Kenya – Prof. N.O. Akech

❖ **DEPARTMENT OF METEOROLOGY**

**Research Activities Undertaken**

The research activities in the Department include;

- Climate variability and predictability using statistical, General Circulation Models (GCMs) and Regional Climate Models (RCMs)
- Development of indices for monitoring and prediction of climate variability in Eastern Africa region
- Link between atmospheric aerosols, stratospheric dynamic, ozone and climate variability
- Effect of urbanization on micro-environment; air pollution transport and dispersion, air quality modelling
- Climate change
- Drought and low flows in the Nile/Flow Regime for International Experimental Network Data (FRIEND) research program
- Mixed tree/crop interfaces in semi-arid environments
- Applications of renewable energy in Kenya.
- Applications of remote sensing in meteorology with particular emphasis on disaster management, hydrology, agriculture and environmental monitoring in support of sustainable food security

<b>Researchers Name(s)</b>	<b>Title of Research</b>	<b>Departments involved</b>	<b>Sponsor</b>
Prof. NJ Muthama Dr. J.M. Ininda Mr. W.B. Masieyi Mr. D.N. Kariithi	Atmospheric Resources Modeling Centre	<ul style="list-style-type: none"> <li>• Department of Meteorology, UON</li> <li>• Kenya Meteorological Department</li> </ul>	KMD & UON
Dr. AO Opere	Nile basin Project- Adapting to climate change induced water stress in the Nile River Basin; WP1: Comprehensive Assessments	<ul style="list-style-type: none"> <li>• Department of Meteorology, UON</li> </ul>	UNEP (Small Scale Funding)

Prof. NJ Muthama Dr. JN Mutemi Mr. BK Mutai Ms Stella Aura	Sensitization of the communities in Kibwezi on the use of weather and climate information for the enhancement of food security	<ul style="list-style-type: none"> <li>• Department of Meteorology, UON</li> <li>• Kenya Meteorological Department</li> </ul>	African Institute for Capacity Development (AICAD)
Dr. GO Ouma Mr. CB Lukorito	Enhancing the Kenyan capacity on climate risk reduction and climate change adaptation for sustainable agricultural productivity and food security	<ul style="list-style-type: none"> <li>• Department of Meteorology, UON</li> </ul>	Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)
Prof. NJ Muthama Prof. MM Manene Ms Stella Aura Dr. RE Okoola Dr. AO Opere Mr. BA Chanzu Mr. PK Runanu Mr. WB Masieyi	National Survey on utilization of weather products in Kenya	<ul style="list-style-type: none"> <li>• Department of Meteorology, UON</li> <li>• Kenya Meteorological Department</li> <li>• Kenya Agricultural Institute (KARI)</li> <li>• Kenya Police</li> <li>• IGAD Climate Prediction and Application Centre (ICPAC)</li> <li>• School of Mathematics, UON</li> </ul>	Kenya Government through Kenya Meteorological Department

## ❖ DEPARMTENT OF PHYSICS

### Research Activities Undertaken

APPLIED ELECTRONICS: Distributed embedded systems platform; Optimized DC power controller; Environmental monitoring and management system; Field Programmable Gate Array (FPGA) based instrumentation; Step numerical control based intelligent Computer Numerical Control (CNC) controller.

APPLIED NUCLEAR & RADIATION PHYSICS: Medical elementology and spectral diagnosis of disease; Radiometric geothermics; Spectroanalytical environmentrics; Material analysis by chemometric spectroscopy; Radiometric beam quality characterization; Gamma ray spectrometry and detector efficiency modelling.

LASER PHYSICS, SPECTROSCOPY & IMAGING: Laser and spark produced dense plasmas diagnostics and modelling; Tuneable diode laser spectroscopy applied to trace

gas monitoring; Application of LED multispectral imaging microscopy to malaria diagnosis; Development of efficient image recognition algorithms with application to malaria diagnosis; Radiative characterization of atmospheric aerosols using Sun Photometry; Quantitative analysis of trace atomic and molecular signatures of HBRA geothermal matrices by chemometrics assisted LIBS; Monitoring aquatic plants proliferation in Lake Victoria using satellite data.

CONDENSED MATTER PHYSICS: PHOTOVOLTAICS: Dye sensitized solar cells (DSSCs); Microcrystalline silicon solar cells; Quantum dot solar cells; Computer simulation and modeling using LABVIEW™ software application; PV systems sizing. SENSORS: Semiconductor sensors and light emitting diodes. THIN FILMS: Electrophoretic deposition (EPD) of TiO<sub>2</sub> thin films for photocatalysis, and other uses. THERMOPHYSICAL PROPERTIES: Nondestructive evaluation and characterization of materials; Thermophysical properties of solids, in particular, ceramics and granular thermal insulators. NANOTECHNOLOGIES for sustainable development.

GEOPHYSICS: Geophysical monitoring of groundwater for earthquake prediction in seismically active areas of Kenya; Integrated geophysical research investigation of greater Magadi area, Kenya; Investigation of nuclear elements and their radiation exposure in carbonatite rocks in South Nyanza and the coastal regions; Elemental analysis of rocks from gold mines in Migori-Transmara complex of South Western Kenya; Assessment of heavy metal fluxes and radiation exposure in extractions and processing of coltan ores in Rwanda; Paleomagnetic and rock magnetic studies of the Proterozoic granites from Western Kenya; Radiation hazards due to tunsstun mining in Rwanda.

THEORETICAL PHYSICS: Studies on neutrino mass at finite temperature; Inflationary Cosmology; Baryogenesis and the Big bang Nucleosynthesis; Cosmic Microwave Background Radiation; Hubble's Law and the Expansion of Space; FLRW Metric; Friedman – Lemaitre, Robertson-Waker Metrix; Galaxy Formation in the BB Theory; Physics at the Earliest Instant of time; Extrapolation of the Universe Backward in Time; Dark Matter and Dark Energy; Cosmological Horizon (past and future); Galactic evolution and distribution – Large Scale Structures of the Cosmos; Flatness/Oldness Problem; Science and Religion (Creation vs. Evolution); Prediction of the characteristic features of alpha decay using quantum mechanical tunneling; Emission of Electrons from cold metallic surfaces by the quantum mechanical tunneling: application to the scanning tunneling microscope; Modes of production, propagation and detection of AM radio waves; Minimization of Atmospheric water vapor and surface Emittance Effects on Remotely Sensed Sea surface temperatures; Remote sensing of precipitable water by a Thermal Infrared Multichannel Approach; The Cosmic rays and neutron decay; Singular integral equations for Decay processes; The Big-bang Cosmology; Detection of gravity waves in Africa using 3 GPS receivers that are separated by 20-30 kms; Characterization of the F-Region current using satellite data and data from ground

based magnetometers during geomagnetic storms and their impact on power grid; Geomagnetic field variations using magnetometer data and GPD data; Spinor Theory of Gravity; Characterization of Plasma Equatorial Anomaly during Equinoxes and Solstices; Variations of the Horizontal component of the magnetic field during storm time from MAGDAS data.

## **5.0 INTERNATIONAL LINKS AND COLLABORATIONS**

The School has the following international links and collaborations through the following departments:

### **❖ DEPARTMENT OF CHEMISTRY**

#### **NEWLY ESTABLISHED LINKAGES**

##### **(a) NOVARTIS-NIBR FELLOWSHIP PROGRAMME**

- Cooperation with Department in supporting the training of staff in research activities related to computational chemistry in order to generate mitishamba database. Novartis donated four computer workstations

##### **(b) Grand Challenges Canada**

- The purpose of this grant is to pursue bold, creative ideas to tackle health problems. The funding amounts to \$100,000.

##### **(c) NCST**

- IFS has provided a research grant amounting to KShs 2,200,000 to help Dr Hellen Njenga in advancing her research career in potential use of surfactants from commiphora.

#### **RESEARCH EQUIPMENT PURCHASED**

- The Department received a donation of GC-MS from Sweden facilitated by Michael and International Foundation of Science (ISP).

### **❖ DEPARTMENT OF GEOLOGY**

#### **INTERNATIONAL LINKS AND COLLABORATIONS**

1. MOU between University of Nairobi and Chinese Earthquake Administration
2. MOU between University of Nairobi and Norwegian Petroleum Academy
3. MOU between University of Nairobi and Schlumberger Oilfield Services Limited

4. Memorandum of understanding for Collaboration on "Mount Kenya Lakes Project" between University of Nairobi, Kenya Wildlife Service, and University of Ghent, Belgium

❖ **DEPARTMENT OF METEOROLOGY**

**International Links and Collaborations**

<b>S/N</b>	<b>Area of Collaborations</b>	<b>Partners</b>
<b>1</b>	Climate variability and predictability using statistical and General Circulation Model (GCM) models	IGAD Climate Prediction and Application Centre (ICPAC) KMD
<b>2</b>	Education and Training	World Meteorological Organization (WMO)
<b>3</b>	Education, Research and Training	European Meteorological Satellite (EUMETSAT)
<b>4</b>	Education, Research and Training	CRC- University of Bourgogne, France
<b>5</b>	Education, Research and Training	WMO Regional Institute for Meteorological Training and Research (IMTR)
<b>6</b>	Sensor Hosting Agreement	Global Lightning Network (GLN)
<b>7</b>	Establishment of Seismological and Meteorological network for Tsunami Early Warning	Kenya Meteorological Department (KMD)
<b>8</b>	Intraseasonal climate variability over Eastern Africa	Centre de Recherches de Climatologie , FRE 2740 CNRS, University de Bourgogne, France:

❖ **DEPARTMENT OF PHYSICS**

**International Links and Collaboration**

- Uppsala University, Sweden
- Lund University, Sweden
- Air Force Research Laboratory/Institute for Scientific Research (Boston College), USA
- Stanford University Solar Center, USA
- University of Rome (La Sapienza), Italy
- Space Environment Research Centre, Kyushu University, Japan

## 6.0 PUBLICATIONS FOR THE YEAR (THE INDICATE AUTHOR, DATE OF PUBLICATION, TITLE PUBLISHER, PLACE OF PUBLICATION)

The School has the following publications for the year through the following departments:

### ❖ DEPARMTENT OF CHEMISTRY

#### LIST OF RESEARCH PUBLICATIONS

1. Endale M, Alao J.P., Akala H.M., Rona N.K., Eyase F.L., Derese S., Ndakala A., Mbugua M., Walsh D.S., Sunnerhagen P., Mate E. and Abiy Y. (2012): Antiplasmodial quinines from pents longiflora and pentas lanceolata, *planta Med*, 78, 31-35.
2. Gumula I., Heydenreich M., Derese S., Ndiege I.O. and Abiy Y., (2012): Isoflavones from the stem bark of platycelphium vonce, *Phytochemistry Letters*, 5, 150-154.
3. Alice Anyango Onyango, Joseph O. Lalah and Shem O. Wandiga (2012). The effects of local cooking methods on polycyclic aromatic hydrocarbons (PAHs) content in beef, goat meat and pork as potential sources of human exposure in Kisumu City, Kenya. **Polycyclic aromatic compounds. 32:** 1-13.
3. Alice Anyango Onyango, Joseph O. Lalah & Shem O. Wandiga (2012): The effect of Local Cooking Methods on Polycyclic Aromatic Hydrocarbons (PAHs) Contents in Beef, Goat Meat, and Pork as Potential Sources of Human Exposure in Kisumu City, Kenya, **Polycyclic Aromatic Compounds, 32:5, 656-668.**

### ❖ DEPARMTENT OF GEOLOGY

#### PUBLICATIONS

1. Daniel Melnick, Yannick Garcin, Javier Quinteros, Manfred R. Strecker, **Daniel Olago**, Jean-Jacques Tiercelin, , Steady rifting in northern Kenya inferred from deformed Holocene lake shorelines of the Suguta and Turkana basins, ***Earth and Planetary Science Letters*** (2012).
2. Yannick Garcin, Daniel Melnick, Manfred R. Strecker, **Daniel Olago**, Jean-Jacques Tiercelin, East African mid-Holocene wet-dry transition recorded in



palaeo-shorelines of Lake Turkana, northern Kenya Rift, Earth Planet. Sci. Lett. (2012).

3. **J.K. Mulwa**, F. Kimata, S. Suzuki, **Z.N. Kuria**, An updated on the seismicity in Kenya for the period 1906-2010, Tono Geoscience Center, 959-31, Jorinji, Izumicho, Toki-shi, Gifu, 509-5012, Japan.

❖ **DEPARMTENT OF METEOROLOGY**

❖ **Publications for the year**

<b>Staff Name</b>	<b>Title of the Paper</b>	<b>Conference/Journal</b>	<b>Date</b>
Prof. Ogallo	Linkages between global sea surface temperatures and decadal rainfall variability over Eastern Africa region	International Journal of Climatology (2012 Royal Meteorological Society)	July 14, 2012
Prof. Muthama	Linkages between global sea surface temperatures and decadal rainfall variability over Eastern Africa region	International Journal of Climatology (2012 Royal Meteorological Society)	July 14, 2012
Dr. Ininda	Linkages between global sea surface temperatures and decadal rainfall variability over Eastern Africa region	International Journal of Climatology (2012 Royal Meteorological Society)	July 14, 2012
Prof. Ogallo	Decadal rainfall variability modes in observed rainfall records over East Africa and their relations to historical temperature changes	Journal of Hydrology (2012 Elsevier B.V.)	July 3, 2012
Dr. Okoola	Decadal rainfall variability modes in observed rainfall records over East Africa and their relations to historical temperature changes	Journal of Hydrology (2012 Elsevier B.V.)	July 3, 2012
Prof. Muthama	Survey on the Utilization of Weather Information and Products for Selected Districts in Kenya	Journal of Meteorology and Related Sciences	August 15, 2012
Mr. Masieyi	Survey on the Utilization of Weather Information and Products for Selected Districts in Kenya	Journal of Meteorology and Related Sciences	August 15, 2012
Dr. Okoola	Survey on the Utilization of Weather Information and Products for Selected Districts in Kenya	Journal of Meteorology and Related Sciences	August 15, 2012
Dr. Opere	Survey on the Utilization of Weather Information and Products for Selected Districts in Kenya	Journal of Meteorology and Related Sciences	August 15, 2012
Prof. Ogallo	Spatial coherence and potential predictability assessment	International Journal of Climatology (2012	October 6, 2012

	of intraseasonal statistics of wet and dry spells over Equatorial Eastern Africa	Royal Meteorological Society)	
Dr. Gitau	Spatial coherence and potential predictability assessment of intraseasonal statistics of wet and dry spells over Equatorial Eastern Africa	International Journal of Climatology (2012 Royal Meteorological Society)	October 6, 2012
Dr. Okoola	Spatial coherence and potential predictability assessment of intraseasonal statistics of wet and dry spells over Equatorial Eastern Africa	International Journal of Climatology (2012 Royal Meteorological Society)	October 6, 2012

## ❖ DEPARMTENT OF PHYSICS

### ***Publications for 2012***

- Kaniu IM, Angeyo KH, Mwala AK and Mangala MJ (2012), “Direct rapid analysis of trace bioavailable soil macronutrients by chemometrics-assisted energy dispersive X-ray fluorescence and scattering spectrometry”, *Anal Chim Acta*, **729** (2012), 21–25
- Mito CO, Boiyio RK, and Laneve G (2012), “A simple algorithm to estimate sensible heat flux from remotely sensed MODIS data”, *International journal of Remote Sensing*, **33**(19) (2012), 6019-6121
- takwa RVM, Simiyu J, Waita SM and Mwabora JM (2012), “Application of Dye-sensitized solar cell technology in the tropics: effects of radiation intensity and temperature on DSSC performance”, *International Journal of Advanced Renewable Energy Research*, **1**(2)(2012), 17-15
- Achola SO, Patel JP, Mustapha AO and Angeyo HK (2012), “Natural radioactivity and external dose in the high background radiation area of Lambwe east southwestern Kenya”, *Radiation Protection Dosimetry*(2012), 1-6
- Olowendo JO, Cilliers PJ, Baki P and Mito C (2012), “Using GPS-SCINDA observations to study the correlation between scintillation, total electron content enhancement and depletions over the Kenyan region”, *Advances in Space Research*, **49**(2012), 1363-1372
- Olowendo JO, Baki P Cilliers PJ, Mito C and Doherty P (2012), “Comparison of GPS TEC measurements with IRI-2007 TEC prediction over the Kenyan region during the descending phase of solar cycle 23”, *Advances in Space Research*, **49**(2012), 914-912
- Ayieko CO, Musembi RJ, Waita SM, Aduda BO and Jain PK (2012), “Structural and Optical Characterization of Nitrogen-doped TiO<sub>2</sub> Thin Films Deposited by Spray Pyrolysis on Fluorine Doped Tin Oxide (FTO) Coated Glass Slides”, *International Journal of Energy Engineering* (2012), **2**(3), 67-72
- Otakwa RVM, Simiyu J, Waita SM and Mwabora JM (2012), “Application of dye-sensitised solar cell technology in the tropics: effects of air mass on device

- performance”, International Journal of Renewable Energy Research, 2(3)(2012)
- *Otakwa RVM, Simiyu J, Waita SM and Mwabora JM (2012), “Application of dye-sensitised solar cell technology in the tropics: effects of radiation intensity and temperature on DSSC performance”, International Journal of Advanced Renewable Energy Research, 1(2)(2012), 109-116*
  - *Kaniu MI, Angeyo KH, Mwala AK and Mwangi FK (2012), “Energy dispersive X-ray fluorescence and scattering assessment of soil quality via partial least squares and artificial neural networks analytical modeling approaches”, Talanta 98(2012), 236-240*
  - *[Angeyo KH](#), [Gari S](#), [Mustapha AO](#) and [Mangala JM](#) (2012), “Feasibility for direct rapid energy dispersive X-ray fluorescence (EDXRF) and scattering analysis of complex matrix liquids by partial least squares”, *Applied Radiation and Isotopes*, (2012) 70(11), 2596-601*

## **7.0 CONSULTANCIES EITHER UNDERTAKEN BY STAFF MEMBERS OR IN THE UNIT AS A WHOLE:**

The following consultancies were undertaken by through the following individuals and departments of the school:

### **❖ DEPARMTENT OF GEOLOGY**

#### **CONSULTANCIES**

1. Kenya School of Monetary Studies Consultancy: Borehole Drilling & Preliminary Hydrological Survey
2. GIA – Consultancy Training Seminar on Gemmology
3. SEUCO – Consultancy Laboratory sessions with students
4. UoN-CAVS Consultancy: Lab. Analysis
5. OMER/M. Odhiambo Consultancy: Lab. Analysis

### **❖ DEPARMTENT OF METEOROLOGY**

#### **Consultancies**

<b>Title</b>	<b>Client</b>	<b>Staff Involved</b>
Provision of consultancy services on Verification of the Internally Displaced Persons due to 2007 elections	Ministry of State for Special Programmes	Prof. Muthama

## 8.0 NO OF STAFF AND THEIR DESIGNATIONS

The School is endowed with high calibre staff from the following department

### ❖ DEAN'S OFFICE, SPS

#### Staff Members and their designation

Assistant Registrar	1
Senior Computer Technologist	1
Secretary Grade C	9
Secretary Grade B	4
Secretary Grade A	10
Clerk Grade IV	2
Office Assistant Grade IV	1
<b>Total</b>	<b>28</b>

### ❖ DEPARTMENT OF CHEMISTRY

#### Staff Members and their designation

Professors	6
Associate Professors	7
Senior Lecturers	8
Lecturers	16
Tutorial Fellows	6
<u>Assistant Lecturer</u>	1
<u>Graduate Assistants</u>	3
<b>Sub-Total</b>	<b>47</b>
Principal Technologist	1
Chief Technologist	1
Senior Admin. Asst.	1
Senior Technologist DEF	9

Technologists ABC	14
Library Assistant ABC	1
Trainee Technologist	-
Technical Assistant III	-
Technical Assistant II	1
<b>Sub-Total</b>	<b>28</b>
<b>TOTAL</b>	<b>75</b>

### **STAFF APPOINTMENTS, PROMOTIONS**

#### **NEWLY APPOINTED/RECRUITED ACADEMIC STAFF**

<b>NAME</b>	<b>GENDER</b>	<b>TITLE</b>
Dr John Onyatta	Male	Lecturer
Ms Ruth Odhiambo	Female	Tutorial Fellow

#### **ACADEMIC STAFF PROMOTED**

<b>NAME</b>	<b>GENDER</b>	<b>PREVIOUS TITLE</b>	<b>PRESENT TITLE</b>
Dr. John Wabomba	M	Tutorial Fellow	Lecturer
Prof. John Onyari	M	Senior Lecturer	Associate Professor

#### **STAFF RETIRED, ON LEAVE OF ABSENCE, TERMINATED, DECEASED**

<b>NAME</b>	<b>GENDER</b>	<b>TITLE</b>	<b>STATUS</b>
Prof. Raphael Munavu	M	Professor	Leave of absence
Dr Evans Kituyi	M	Snr Lecturer	Leave of absence

Prof. Paul Shiundu	M	Professor	Leave of absence
Mr Joseph M. Ng'ang'a	M	Principal Technologist	Retired
Mr. Francis K. Ndule	M	Lab Attendant	Retired
Dr. Wenwa A. Odinga	F	Snr. Lecturer	Leave of absence

**❖ DEPARMTENT OF GEOLOGY  
STAFF MEMBER AND THEIR DESIGNATION**

Professors	2
Associate Professors	4
Senior Lecturers	5
Lecturers	2
Tutorial Fellows	4
<u>Assistant Lecturer</u>	1
<u>Graduate Assistants</u>	2
<b>Sub-Total</b>	<b>23</b>
Chief Technologist	1
Senior Technologist	5
Technologist ABC	1
Technical Assistant IV	2
Trainee Technologist	2
<b>Sub-Total</b>	<b>11</b>
<b>Total</b>	<b>34</b>

❖ **DEPARMTENT OF METEOROLOGY**

<b>Designation</b>	<b>No of Staff</b>
Professor	2
Associate Professor	2
Senior Lecturer	9
Lecturer	3
Assistant Lecturer	0
Graduate Assistant	2
Administrator	0
Principal Technologist-	1
Senior Technologist	2
Technologist	3
Trainee Technologist	0
Secretary	2
Clerk	0
Driver	0
<u>Messenger</u>	<u>0</u>
<b>Total</b>	<b>26</b>

❖ **DEPARMTENT OF PHYSICS**

<b>Designation</b>	<b>No. of staff</b>
Professor	2
Associate Professor	1
Senior Lecturer	5
Lecturer	9
Assistant Lecturer	0
Tutorial Fellow	7
Graduate Assistant	0
Administrator	0
Principal Technologist	1
Chief Technology	0

Senior Technologist	2
Technologist	3
Trainee Technologist	0
Secretary	2
Clerk	0
Driver	0
Messenger	0
<b>Total</b>	<b>22</b>

**9.0 NUMBER OF GRADUANDS (DIPLOMA, BACHELORS, PGD, MASTERS AND PHDs):**

The School has produced the following graduates as listed below:

❖ **DEAN'S OFFICE, SPS**

<b>BSc.</b>	<b>120</b>
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❖ **DEPARMTENT OF CHEMISTRY**

**NUMBER OF STUDENTS WHO GRADUATED FROM EACH PROGRAM**

<b>Ph.D.</b>	<b>1</b>
<b>M.Sc</b>	<b>12</b>
<b>B.Sc Industrial Chemistry</b>	<b>19</b>

**NUMBER OF STUDENTS DISCONTINUED ON ACADEMIC GROUNDS**

<b>BSc</b>	<b>0</b>
<b>MSc</b>	<b>2</b>
<b>Ph.D</b>	<b>0</b>



❖ **DEPARMTENT OF METEOROLOGY**

**Number of Graduands (2012)**

<b>S/N</b>	<b>Certificate</b>	<b>Number Graduands</b>
1	Diplomas	N/A
2	Bachelor of Science in Meteorology	42
3	Postgraduate Diploma in Meteorology	1
4	MSc in Meteorology	5
5	MSc in Agrometeorology	1
6	PhD	0
<b>Total</b>		<b>49</b>

❖ **DEPARMTENT OF PHYSICS**

**Number of graduands**

<b>Ph.D.</b>	<b>0</b>
<b>M.Sc</b>	<b>7</b>
<b>B.Sc</b>	<b>21</b>

**10.0 PAPERS PRESENTED AT CONFERENCES:**

The following are the conferences attended by the respective staff in terms, venues and dates of the conferences:

❖ **DEPARMTENT OF CHEMISTRY**

**WORKSHOPS AND CONFERENCES ATTENDED**

<b>S/No.</b>	<b>Staff Name</b>	<b>Conference attended</b>	<b>Date</b>	<b>Venue</b>
1	Prof G. Kamau	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
2	Dr P. Gitari	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi,

				Kenya
3	Dr L. Kerubo	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
4	Dr A. Ndakala	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
5	Mrs R. Odhiambo	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
6	Dr S. Derese	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
7	Prof S. Wandiga	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
8	Dr A. Yusuf	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
9	Prof R. Munavu	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
10	Dr J. Kithinji	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
11	Prof Abiy Yenesew	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
12	Prof B. Bhatt	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
13	Mr W. Tonkei	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
14	Mr C. Karani	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
15	Mr T. Hannington	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
16	Mr F. Mwazighe	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
17	Mr D. Buyinza	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya

17	Mr E. Terer	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
19	Mr P. Lekimain	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
20	Mr A. Negera	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
21	Ms A. Kerandi	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
22	Dr H. Njenga	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
23	Prof L. Njenga	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
24	Dr P. Guto	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
25	Ms M. Mutisya	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
26	Ms V. Muinde	2 <sup>nd</sup> IYC Conferece	15-17 February 2012	Nairobi, Kenya
20	Mr C. Mirikau	FNRBA Workshop on fundamentals of nuclear reactor safety & regulations	13-17 February 2012	Nairobi, Kenya
21	Dr. A. Ndakala plus other members of Dept	Seminar on Short stories on computational medicinal chemistry by Dr Lewis Whitehead and Dr Heather Burke	8 February 2012	Nairobi, Kenya
22	Dr. A. Yusuf, Dr L. Kerubo Dr J. Wanjohi	Seminar on chemistry crystals by Prof N. Sathyamurthy	7 February 2012	Nairobi, Kenya
23	Mr A. Negera Abdissa	Seminar on Antiplasmodial	9 March 2012	Nairobi, Kenya

		anthraquinones from East African plants of the asphadelaceae family		
24	Prof S. Wandiga	PACN round table discussion	23 February 2012	London, England
25	Dr B. Wamalwa	Workshop on jnr fellows program	15-18 January 2012	Bonn, Germany
26	Prof S. Wandiga	UNESCO-KALINGA Prize for popularizing science	2-7 January 2012	Bhabaneswar, India

#### ❖ DEPARTMENT OF METEOROLOGY

##### Papers Presented at Conferences

S/N	Staff Name	Title of the Paper	Date	Conference/Journal
1	Dr. Gitau	Spatial coherence and potential predictability assessment of intraseasonal statistics of wet and dry spells over Equatorial Eastern Africa	Feb. 20-22, 2012	PICREVAT Workshop: Predictability of climatic information to reduce the vulnerability of Tropical Agriculture, Izaak Walton Inn, Embu
2	Prof. Muthama	The Relationship between Atmospheric Aerosols and Rainfall over the Three Cities in Kenya	May 28-June 2	BALWOIS 2012 – Ohrid, Republic of Macedonia
3	Prof. Ng'ang'a	The Relationship between Atmospheric Aerosols and Rainfall over the Three Cities in Kenya	May 28-June 2	BALWOIS 2012 – Ohrid, Republic of Macedonia
4	Prof. Muthama	A review and assessment of applicability of the heat stress indices in the Kenyan Weather forecast	May 7-11, 2012	NSCT-The first national science, technology and innovation week
5	Ms. Bosire	Assessment of the predictability of rainfall on seasonal timescales over East Africa using climate forecast	May 9, 2012	Departmental Seminar

## ❖ DEPARTMENT OF PHYSICS

### *Papers Presented at Conferences*

- Muiva CM, Sathiaraj TS and Mwabora J (2012), “Chemical bond approach to crystallisation kinetics and thermal stability in some  $\text{Se}_{90}\text{In}_{10}\text{Sb}_x$  chalcogenide glassy alloys”, 2<sup>nd</sup> African Materials Science and Engineering Network (AMSEN) Workshop, 21-23 March 2012, Nairobi, Kenya
- Angeyo HK (2012), “Coupling energy dispersive X-ray fluorescence and scattering (EDXRFS) and chemometrics for rapid non-invasive quality assurance analysis and characterisation of complex matrix materials”, 2<sup>nd</sup> African-European conference on chemometrics, November 19-23, 2012, Stellenbosch, South Africa
- Omucheni DL (2012), “Utility of multivariate chemometric techniques in multispectral image analysis: an application to malaria diagnostics”, 2<sup>nd</sup> African-European conference on chemometrics, November 19-23, 2012, Stellenbosch, South Africa
- Musembi RJ (2012), “Solar PV training kit, a novel community outreach program in Kenya”, 1<sup>st</sup> international conference on physics for the development, 10-14 October 2012, Belgium
- Nyang'onda T (2012), “Analysis of Root Mean square roughness of Microcrystalline silicon thin films using scanning probe image processor software”, International Conference on Nanoscience+Technology, July 23- 27, 2012, Paris, France.
- Omucheni DL (2012), “A joint Kenyan-Ivory Coast Malaria Measurement campaign”, International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya.
- Omucheni DL, Kaduki KA and Angeyo HK (2012), “Application of Principal Component Analysis (PCA) to Multispectral Imaging Microscopy for Malaria Diagnostics”, International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya.
- Mukhono P (2012), “Chemometrics -Assisted Laser Induced Breakdown Spectroscopy of High Background Radiation Areas Geothermal Field Matrices”,

International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya

- Mukhono PM, Angeyo HK, Massop D and Kaduki KA (2012), “Laser induced breakdown spectroanalysis and characterization of environmental matrices utilizing multivariate chemometrics “,International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya
- Cheruiyot EK, Mito CO and Kaduki KA (2012), “Application of Multi-spectral Satellite Imagery in Monitoring of Aquatic Vegetation and Water Quality Parameters in Large Inland Waters”, International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya
- Memeu, DM, Kaduki KA and Mjomba CK (2012), “Automatic classification of plasmodium parasites using stained RGB images”, International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya
- Gathoni R (2012), “Gas in scattering media absorption spectroscopy”, International workshop on Spectral Imaging in remote sensing, 17-28<sup>th</sup> September 2012, Nairobi, Kenya
- Aduda B(2012), “Opportunities for and challenges to energy sufficiency and sustainability in the Kenya energy sector”, Building a future energy system in Africa How can science academies contribute? Workshop, 10<sup>th</sup> September 2012, Stockholm, Sweden

## **11.0 CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES IF ANY:**

The following are some of the corporate social responsibility activities undertaken at the school:

### **❖ DEPARMTENT OF CHEMISTRY**

#### **OUTREACH AND COMMUNITY SERVICE ACTIVITIES**

1. Prof. J.O. Midiwo: NAPRECA Executive secretary; External examiner, Maseno University
2. Prof. Abiy Yenesew: External examiner Kenyatta University, Maseno University University of Botswana, University of Dar-es-Salaam; Journal of Bulletin of Chemical Society of Ethiopia Referee

3. Dr. D.K. Kariuki: KEBS Water Quality committee; NEMA Hazardous and Toxic Materials committee member; WRMA Threshold Pollution in Waste Water Committee.
4. Dr. B.M. Wamalwa: Board member of Japan Government scholarships
5. Prof. Wandiga S.O.: Chairman Bondo University Council; Pan African Chemistry Network Chairman, Regional Chapter; UNEP/GEF-UoN Project coordinator, UNEP POPs project coordinator
6. Dr. A.O. Yusuf: External examiner JKUAT, Kenyatta University; IDB Scholarship Selection Committee Board Member.
7. Prof. L. W. Njenga: External Examiner, Makerere University, and also Board of Governor for Gatura Girls High School.

❖ **DEPARMTENT OF METEOROLOGY**

**Corporate Social Responsibility**

<b>Title</b>	<b>Partners</b>	<b>Staff Involved</b>
Meeting of heads of meteorological services	<ul style="list-style-type: none"> <li>•Kenya Meteorological Society (KMS)</li> <li>•East African Community (EAC)</li> </ul>	Prof. Muthama
Field Study in Western & Nyanza regions_ Verification of IDPs in Kenya	Ministry of Special Programmes	Prof. Muthama
RFA development retreat- Higher Education Solutions Network	<ul style="list-style-type: none"> <li>• University of Washington</li> <li>• University of Nairobi</li> </ul>	Prof. Muthama
Pilgrimage to Jerusalem	<ul style="list-style-type: none"> <li>• Emmaus Agencies</li> <li>• Embassy of the Arab Republic of Egypt</li> </ul>	Prof. Mutua
Technical Assistance to Kenya Water Institute (KEWI) to upgrade to University status	KEWI	Prof. Mutua
NUMA High School Outreach Programme	<ul style="list-style-type: none"> <li>•KMS</li> <li>•Kenya Meteorological Department (KMD)</li> </ul>	<ul style="list-style-type: none"> <li>• NUMA</li> <li>• Prof. Muthama</li> </ul>
Co-Supervision of PhD student- E.M. Masinde	<ul style="list-style-type: none"> <li>• Department of Computer Science, University of Cape Town</li> </ul>	Prof. Muthama
Drafting Retreat	<ul style="list-style-type: none"> <li>• Arid lands Network</li> <li>• Ministry of Environment and Mineral Resources</li> </ul>	Prof. Muthama

## 12.0 ANY OTHER ACTIVITIES

The following are other activities by the school:

### ❖ DEPARMTENT OF CHEMISTRY

#### RESEARCH THESIS TITLES

##### Ph.D. Thesis Titles

NAME	TITLE
Milkyas Endale	Phytochemical analysis of selected pentas species for antiplasmodial principles

##### M.Sc Thesis Titles

Muinde, Veronica. I56/78955/09	Investigating the Factors Affecting Levels of Omega-3-Polyunsaturated Fatty Acids (PUFA) Levels in Commercial Fish from Lake Victoria
Chanzu, Harry I56/76520/09	Biosorption of organic dyes using spent brewery grains in batch and continuous systems
Kennedy Owuor Olale I56/78094/09	Phytochemical Screening and Infrared Predictions of Wood Density and Carbon with Emphasis on <i>Prinus Africana</i> of Kenya
Bernard Macharia I56/77604/2009	Phytochemical Investigation of <i>Milletia Oblata ssp.teitensis</i> for Antiplasmodial and Larvicidal Principles
Ms. Amina Bakari	A survey of mercury pollution from fluorescent lamps disposal in selected sites in nairobi and environs.
Mr. Leonard Baraza	Phytochemical investigation of millettia oblata for antiplasmodial and larvicidal principles.
Mr. Tom Oduor	Investigation of nutritional components of <i>tylosema</i>



Okumu	<i>fassoglense</i>
Mr. Wycliffe Chisutia Wanyonyi	Biosorption of organic dye from aqueous solution using <i>eichhorinia crassipes</i> from lake victoria
Mr. Amboga Davis Anzeze	Adsorption Studies of plant biomass from water hyacinth( <i>eichhornia crassipes</i> ) and possible utilization in removal of heavy metals from polluted water streams

## ❖ DEPARMTENT OF METEOROLOGY

### (a) Promotions

- Dr. Wilson Gitau and Mr. Stephen K. Rwigi were promoted to the position of lecturer
- Ms. Dorcus K. Mule promoted to the position of Technologist Grade ABC

### (b) Visitors to the Department:

DATE	NAME OF VISITOR	ADDRESS
29/2/2012	Dr. Richard Anyah	University of Connecticut, USA
1/3/2012	David N. Mburu	Kenya Meteorological Department (KMD)
1/3/2012	Edward M. Muriuki	KMD
1/3/2012	James Nguo	Alin. Net
1/3/2012	Anthony Mugo	Alin.Net
23/3/2012	Charles Ngunjiri	Ministry of EAC, P.O. Box 3795, Nairobi
23/3/2012	Peter Ambenje	KMD
23/3/2012	Hesbon Odongo	SBS – ISO Internal Quality Auditor
23/3/2012	P.W. Khaoya	CBPS ISO Internal Quality Auditor
15/5/2012	Elizabeth Page	UCAR/COMET
15/5/2012	Arlene Laing	UCAR/COMET ( <a href="http://www.meted.ucar.edu">www.meted.ucar.edu</a> )
22/5/2012	Mara Child	University of Washington, USA
24/5/2012	David Muchemi	KMD
10/7/2012	Mr. Mutuku U. Kioko	Makueni Boys High School, P.O. Box 20, Makueni
15/7/2012	Dr. Mark Higgins	EUMETSAT
10/10/2012	Nancy Mberia	Nuclear Electricity Project
10/10/2012	Harrison Ngugi	Nuclear Electricity Project
16/10/2012	T.N. Krishna Murti	FSU, Tallahassee, USA
16/10/2012	Vinay Kumar	FSU, Tallahassee FL-32306, USA
1/11/2012	Dan Okaka	
1/11/2012	Charles Otieno	

1/11/2012	Stephen Juma	Hawinga Girls Secondary School, P.O. Box 25, Siaya
12/11/2012	Thomas Ekajja	Broadcast Solutions International
22/11/2012	Peris Gateri	UAP Insurance Ltd., P.O. Box 43013-00100, Nairobi
5/12/2012	Michael Mbaka	FSD Kenya, P.O. Box 11353-00100, Nairobi
5/12/2012	Diana Rono	UAP Insurance Ltd., P.O. Box 43013-00100, Nairobi
5/12/2012	Mary Mbataru	UAP Insurance Ltd., P.O. Box 43013-00100, Nairobi
5/12/2012	James Kiguru	UAP Insurance Ltd., P.O. Box 43013-00100, Nairobi

**(c) Publications donated to the Department of Meteorology by Dr. A.O. Opere**

The value of the publications is 30,000/=

	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>ISBN</b>	<b>WMO-NO</b>
1	Integrated flood management (concept paper)	M. Jarraud	APFM	978-92-63-11047-3	1047
2	Guidance on water and adaptation to climate change	J. Kubis		978-92-1-117010-8	
3	Comprehensive Risk assessment for natural hazards	Charles S. Melchin	WMO		955
4	Trans-boundary flood Risk management	M.V. der Valk	UN	978-92-1-117011-5	
5	Economic aspects of flood management	Prof. Kamta	APFM	92-63-11010-7	1010
6	Manual on estimation of probable maximum precipitation	Aaron F. Thomson, Paul Pilon	WMO	978-92-63-11045-9	1045
7	Guide to Hydrological practices Vol.1	Robert Halliday, Ann Cauden	WMO	978-92-63-10168-6	168
8	Guide to Hydrological practices Vol.1 6 <sup>th</sup> Edition	Robert Halliday, Ann Cauden etc	WMO	978-92-63-10168-6	168

NB: Enrollment and international student component are together under number three (3)