Curriculum Vitae

Dr. Billy Amendi Makumba

(I). Personal information

NAME: Billy Amendi Makumba

TITLE: Dr.

Address(es)

Physical: Bushiangala, Ikolomani—Along Sigalagala-Butere Road

Permanent: P.O. Box 461—50100, KAKAMEGA—KENYA.

Office: Moi University; School of Sciences and Aerospace Studies; MacKay

Buildina:

P.O. Box 3900—30100, ELDORET—KENYA.

Telephone(s) Solution Office 053 43620 Ext 2821 Mobile (i): +254 720 670 935

Mobile (ii): +254 733 253 767

Fax: (053) 43292

E-mail: | billymakumba@gmail.com / billymakumba@yahoo.com

billymakumba@mu.ac.ke

ORCID <u>https://orcid.org/0000-0002-9315-9453</u>

Nationality: | KENYAN

Date of birth: 30th July 1976

Marital Status: Married

Gender: Male

Career objective | To contribute to knowledge and development through pragmatic, dynamic

and proactive public-driven policy framework, leading to socio-economic

stability.

(II). Education and Training

a) Education

i) Period/Years: August 2010 to October 2016

Title of qualification awarded: PhD.

Principal subject(s): Phytopathology

Scholarship Awards & Honours: National Commission for Science & Technology PhD Research Grant

Institution: University of Eldoret

ii) Period/Years: November 2002 to October. 2008

Title of qualification awarded: MSc.

Principal subject(s): Microbiology

Scholarship Awards & Honours: University of Nairobi Post Graduate Studies Scholarship

Institution: University of Nairobi

iii) Period/Years: November 1995 to July 1999

Title of qualification awarded: BSc.

Principal subject(s): Botany/Chemistry

Institution: University of Nairobi

iv) Period/Years: January 1990 to December 1993

Title of qualification to be awarded: KCSE Certificate

Institution: Shikunga High School

b) Training

i) Years/Dates: July 8th to 22nd 2020

Training Course: An Introduction to Open Data Kit

Venue: On-line

ii) Years/Dates: Oct 15th to 19th 2018

Training Course: Regional Short Course on Research Analytics and Proposal Wrtitting

Venue: ARC Hotel—Egerton University-Nakuru, Kenya

iii) Years/Dates: Jun 11th to 15th 2018

Training Course: | Short Course Workshop on Programme Development, Curriculum and

Supervision

Venue: | Sirikwa Hotel—Eldoret, Kenya

iv) Years/Dates: Jul 25th and 26th 2012

Training Course: National TISC workshop on Innovation support through access to

technological knowledge: Patent information search strategies

Venue: Hilltop Hotel—Nairobi, Kenya

v) Years/Dates: Jul 8th to 14th 2012

Training Course: International Internship Programme in Intellectual Property Rights and

Technology transfer

Venue: Michigan State University—East Lansing, USA.

vi) Years/Dates: Mar 5th to 9th 2007

Training Course: | Plant Disease Diagnostic Technology workshop

Venue: Kenya Agricultural and Livestock Research Organization (KALRO)

formerly Kenya Agricultural Research Institute (KARI), National Research

Laboratories—Nairobi, Kenya.

vii) Years/Dates: Sept 8th to 10th 2004

Training Course: | Electron Microscopy & Stereology workshop

Venue: Faculty of Veterinary Medicine, University of Nairobi—Kenya

(III) Experience

a) Professional/Academic

i) Years/Dates: Aug 2011 to Date

Position: Lecturer

Institution/Company: Moi University; School of Sciences & Aerospace Studies

Duties/Responsibilities:

- i) To contribute towards the achievement of the mission and vision of Moi University
- ii) To contribute effectively to the creation and circulation of knowledge through effective teaching, researching and publishing
- ii) To enrich the intellectual development of students through interaction and academic counseling in my areas of specialization
- iv) To participate in institution building and extra-curricular activities of my Department and School in order to create a rich and vibrant intellectual environment at Moi University

ii) Years/Dates:

Aug 2008 to Jul 2011

Position:

Research Officer

Institution/Company:

Moi University; Vice Chancellor's Office

Duties:

- i) Carrying out research programs as assigned by the VC
- ii) Executing collaborative research assignments/programs with other institutions
- iii) Writing research proposals for proposed projects for funding
- iv) Forging research linkages with other higher learning institutions both locally and internationally.

iii) Years/Dates:

Mar 2005 to Jul 2008

Position:

Laboratory Researcher/Quality Control Manager for Biopesticides

Institution/Company:

Dudutech (K) Limited

Duties:

- i) Carrying out research programs on the use of microbials (Bacterial, Viral, Fungal and Nematodes) for biocontrol. This involved development of protocols on isolation, efficacy bioassays and quality control procedures.
- ii) Mass production of biological control agents
- iii) Quality control of microbial products
- iv) Culture collection, preservation and maintenance.
- v) Plant pathological analysis of soil and plant samples
- vi) Training: Identifying training needs of staff and devising training programmes as appropriate
- vii) Report writing and recommending action plan to the Laboratory Director (Technical Manager—Biorationals)

b) Administrative experience

i) Years/Dates:

Aug 2017 to Date

Position:

Department of Biological Sciences Industrial Attachment Co-ordinator, Moi University

ii) Years/Dates:

Aug 2012 to Apr 2014

Position:

School of Biological & Physical Sciences ISO Champion, Moi University

iii) Years/Dates:

Feb 2012 to Apr 2014

Position:

School of Biological & Physical Sciences PSSP Coordinator, Moi

University

iv) Years/Dates:

Aug 2011 to Apr 2014

Position:

School of Biological & Physical Sciences Examinations Coordinator, Moi University

v) Years/Dates: Aug 2011 to Jun 2012

Position: Representing the HOD; Department of Biological Sciences, School of

Biological & Physical Sciences, Moi University

IV).Projects/Research Grants

i) Years/Dates: 2020 to 2024

Project Title: Nematology Education in Sub-Saharan Africa (NEMEDUSSA)—Moi

University, Kenya

Granter: VLIR-UOS/Erasmus+ Programme of the European Union

ii) Years/Dates: 2019 to 2023

Project Title: Determining Nematode Damage and Mitigation for Increased Finger

Millet Productivity for Food and Nutritional Security in Kenya

Granter: VLIR-UOS

iii) Years/Dates: 2018 to 2023

Project Title: Enhancing Livelihoods of Smallholder Farmers in Western and Eastern

Kenya through Agro-ecological Intensification with Sorghum based

Interventions

Granter: Mcknight Foundation

iv) Years/Dates: Nov 2012 to Nov 2016

Project Title: In vitro screening of cereals rhizobacteria for antagonism against

sorghum phytopathogens and their potential use in biocontrol

Granter: National Commission for Science, Technology and Innovation

v) Years/Dates: Nov 2012 to Nov 2014

Project Title: Dyeing with *Tagetes minuta* inflorescence extracts at industrial level

Granter: National Commission for Science, Technology and Innovation

(V).Teaching subject area(s) i) Microbiology/Mycology

ii) Phytopathology

iii) Botany

iv) Biochemistry

(VI). Supervision Experience

i) BSc Students

a) Moses Maina Kabuu Studied at Moi University. Reg No. MIC/009/2016

Project Title:

A Comparative Study of Antibiotic Resistance by Escherichia coli and

Staphylococcus aureus.

b) Catherine Nyokabi Ngugi | Studied at Moi University. Reg No. MIC/015/2016

Project Title:

Isolation, Identification and Control of Microbes on Computer Hardware.

c) Karanja Njiru Studied at Moi University. Reg No. MIC/016/2016 **Project Title:** Application of Neem, Aloe vera and Honey in Treatment of infected wounds in Livestock. d) Keith Irungu Studied at Moi University. Reg No. MIC/008/2016 Project Title: Testing the effectiveness of some Antiseptics and Disinfectants against Bacterial Isolates. e) Samson Brian Simwa Studied at Moi University. Reg No. MIC/020/2016 **Project Title:** Comparative Analysis of Antimicrobial Strength of Neem and *Aloe vera* extracts on Escherichia coli. Studied at Moi University. Reg No. MIC/017/2015 Zacharia Mwaura Project Title: Isolation of Enterobacteriaceae in Water Samples of Lake Naivasha. g) Dennis Casmil Otieno Studied at Moi University. Reg No. MIC/1002/2015 Project Title: Antibacterial Activity of the Black Nightshade (Solanum nigrum) Leaf Extract on Salmonella paratyphi and Staphylococcus aureus. h) Mercy Gunyanyi Studied at Moi University. Reg No. MIC/009/2014 **Project Title:** Detection of Bacterial Diversity from Mobile Phones used by Students, Workers and Food Vendors at Moi University-Main Campus. Griveson K. Lidahuli Studied at The University of Eldoret. Reg No. MIC/015/2009 Thesis Title: Determination of the Presence of Microorganisms in Assorted Spices used at The University of Eldoret. Mary Migwi Waithira Studied at The University of Eldoret. Reg No. MIC/019/2009 Thesis Title: Role of *Pseudomonas* spp. in the Degradation of Polythene. k) Paul Muyoma Wanjala Studied at Chepkoilel University College. Reg No. SC/231/2009 Thesis Title: Determination of the Efficiency of the Sewage Treatment Plant at Chepkoilel University College. Studied at Chepkoilel University College. Reg No. MIC/010/2008 Norah Jepkemoi Kamuren Thesis Title: Female Students in Chepkoilel University College. Studied at The University of Eldoret. Reg No. MIC/043/2008 m) Nelly J. Rotich

Determination of the Presence of Escherichia coli as a Risk Factor Among

Thesis Title:

Prevalence of Bean Anthracnose on Seeds used for Food Production in

Elgeyo-Marakwet County, Kenya.

Studied at The University of Eldoret. Reg No. SC/179/2007 n) Irene Chepkoech

Thesis Title:

Determination of the Presence of Pathogenic Enterobacteriaceae at the

Kericho Sewage Treatment Plant.

ii) PhD Students who successfully completed their studies and Graduated in July 2021

a) Becky Nancy Aloo

Studied at The Nelson Mandela African Institute of Science and Technology, Arusha—Tanzania. Reg No. NM-AIST/P236/KEN.17 Project Title:

Characterization of Rhizobacteria and their Formulation into Biofertilizers for Potato (*Solanum tuberosum* L.) Growth Promotion in Tanzania.

iii) MSc Students who successfully completed their studies and Graduated in Nov 2019:

a) George Kiplimo Chepkwony

Studied at The University of Eldoret. Reg No. SC/PGB/040/2013 Thesis Title:

The Effectiveness of *Moringa oleifera* and Charcoal Filter in Purification of Water from Unprotected Sources in Kapseret Division, Uasin Gishu county, Kenya.

b) Kipkogei Chemitei

Studied at The University of Eldoret. Reg No. SSCI/BIO/M/014/2016 Thesis Title:

Bio-conrol of Selected Barley pathogens using *Paenibacillus polymyxa* Kal245 isolated from Sorghum Rhizosphere in Western Kenya.

iii) MSc Students who successfully completed their studies and Graduated in Nov 2021:

a) Caroline Auma Okong'o

Studying at Rongo University. Reg No. MPLB/6001/2015 Project Title:

Screening and selection of sorghum genotypes for resistance to covered kernel smut disease for western Kenya

iv). Currently Supervising MSc Students

a) Emmy Jeptoo Cheruiyot

Studying at The University of Eldoret. Reg No. SC/PGB/001/2015 Project Title:

Biocontrol of Blight Disease of Tomato (*Solanum Lycopersicum* L) using Volatiles and Non-volatiles produced by *Trichoderma* and *Beauveria* species.

b) Gladys Chepkemoi

Studying at The University of Eldoret. Reg No. SC/PGB/003/2016 Project Title:

Biological Control of Early Blight in Tomato using Rhizospheric Actinobacteria from Medicinal Plants.

c) Patrick Kiprop Koech

Studying at The University of Eldoret. Reg No. SAGR/SCH/M/016/2018 Project Title: Use of Paenibacillus polymyxa Kal245 in plant growth promotion and management of covered kernel smut and other diseases in sorghum

d) Brenda Kinanu

Studying at Moi University. Reg No. MSC/PAT/5833/21

<u>Project Title:</u> Evaluation of interactions between selected plant parasitic nematodes and blast in finger millet

(VII).

Conferences/Workshops

a) Conferences Organized

i) Years/Dates: 2nd to 13th Mar 2015

Conference: 2nd AfricaLics Academy

Venue: Moi University—Mombasa Campus, Mombasa—Kenya

ii) Years/Dates: 19th to 30th Nov 2012

Conference: 1st AfricaLics Academy (Inaugural Doctoral Academy in Africa)

Venue: Kenya School of Monetary Studies (KSMS), Nairobi—Kenya

b) Conferences/Forums/Worksh ops Attended

i) Years/Dates: 23rd to 25th Feb 2022

Symposium Title 1st Pan-African Nematology Network (PANEMA) Workshop

Venue: EKA Hotel, Eldoret

ii) Years/Dates: 24th Oct 2019

Symposium Title | Elongating the Flagellum

Venue: Forestry Complex, University of Eldoret

iii) Years/Dates: 20th to 26th Oct 2018

Conference 6th African Higher Education Week, RUFORUM Bienniel Conference

Venue: Kenyatta International Conference Centre (KICC)

iv) Years/Dates: 21st to 25th Jul 2014

Conference: 4th RUFORUM Biennial Conference

Venue: VIP Hotel—Maputo, Mozambique

v) Years/Dates: 23rd to 27th Sept 2014

Conference: 10th Annual Moi University International Conference

Conference Theme: Science and Technology for Sustainable Development

Venue: Margaret Thatcher Library—Moi University, Eldoret

vi) Years/Dates: 24th to 26th Oct 2012

Conference: The East African Higher Education Forum 2012.

Conference Theme: Linking Universities to Industry for Building Knowledge-based Economies

and Regional Integration in East Africa

Venue: Naura Springs Hotel—Arusha, Tanzania

vii) Years/Dates: 4th to 8th Aug 2009

Conference: 5th Annual Moi University International Conference

Conference Theme: Research and Knowledge Dissemination Towards the Building of Healthy

and Socio-economically Stable Nations

Venue: | Margaret Thatcher Library—Moi University, Eldoret

viii) Years/Dates: 16th to 18th April 2009

Conference: International Conference on Emerging Trends in Production,

Processing and Utilization of Natural Fibres

Venue: Hotel Mayfair—Mumbai, India

(VIII) Awards

i) Years/Dates: 30th January 2012

Award: Prof. Bethwell Allan Ogot Innovations Award

Being awarded for: Having invented a natural dye "TAMI Dye" for the textile industry

(IX) Professional Membership

Global Outreach Member of The American Society of Microbiology

(IX) Publications: Refereed Publications

- Aloo, B. N., Mbega, E. R., Makumba, B. A., and Tumuhairwe, J. B. (2022). Life Inside Plants: Insights into the Lifestyle, Diversity, and Metabolites of Endophytic Bacteria Involved in Plant Defense Against Phytopathogens. In: A. Kumar (ed.), Microbial Biocontrol: Sustainable Agriculture and Phytopathogen Management. Springer Nature Switzerland AG. Cham, Switzerland (pp. 77-111). https://doi.org/10.1007/978-3-030-87512-1_4
- Aloo, B.N., Mbega, E.R., Makumba, B.A., and Tumuhairwe, J.B. (2022). Effects of Carrier Materials and Storage Temperatures on the Viability and Stability of Three Biofertilizer Inoculants Obtained from Potato (Solanum tuberosum L.) Rhizosphere. Agriculture, 12, 140. https://doi.org/10.3390/agriculture12020140
- Aloo, B. N., Mbega, E. R., Tumuhairwe, J. B., and <u>Makumba, B. A.</u> (2021). Advancement and practical applications of rhizobacterial biofertilizers for sustainable crop production in sub-Saharan Africa. *Agric & Food Secur 10:57.* https://doi.org/10.1186/s40066-021-00333-6
- 4) Aloo B. N., Mbega E. R., Makumba B. A., and Tumuhairwe J. B. (2021) Effects of agrochemicals on beneficial plant rhizobacteria in agricultural systems. Environmental Science and Pollution Research. 28(43):60406-60424. https://doi.org/10.1007/s11356-021-16191-5
- 5) Aloo B. N., Mbega E. R., and Makumba B. A. (2021) Sustainable Food Production Systems for Climate Change Mitigation: Indigenous Rhizobacteria for Potato Bio-fertilization in Tanzania. In: Leal Filho W., Oguge N., Ayal D., Adeleke L., da Silva I. (eds) African Handbook of Climate Change Adaptation. Springer Nature Switzerland AG. Cham, Switzerland (pp. 1469-1495). https://doi.org/10.1007/978-3-030-42091-8_276-1
- 6) Aloo, B. N., <u>Makumba, B. A.</u>, and <u>Mbega, E. R.</u> (2021). Status of biofertilizer research, commercialization, and practical applications: A global perspective. In: Rakshit, A., Meena, V. S., Parihar, M., Singh, H. B. and Singh, A. K. (eds)., Biofertilizers Volume 1: Advances in Bio-inoculants (pp.191-208). Cambridge, MA. Woodhead Publishing.
- 7) Aloo, B. N., Tripathi, V., Mbega, E. R., and Makumba, B. A. (2021). Endophytic Rhizobacteria for Mineral Nutrients Acquisition in Plants: Possible Functions and Ecological Advantages. In: Maheshwari, D. K., and Dheeman, S (eds)., Endophytes: Mineral Nutrient Management, Volume 3. Springer Nature Switzerland AG. Cham, Switzerland Pp. 267-291. https://doi.org/10.1007/978-3-030-65447-4
- Aloo, B. N., Mbega, E. R., and <u>Makumba, B. A.</u> (2020). Phosphate-Solubilizing Rhizobacteria: Diversity, Mechanisms, and Prospects in Sustainable Agriculture. Preprints. http://doi:10.20944/preprints202009.0681.v1
- 9) Aloo, B. N., Mbega, E. R., Makumba, B. A., Friedrich, I., Hertel, R., and Daniel R. (2020). Whole-genome sequences of three plant growth-promoting rhizobacteria isolated from Solanum tuberosum L. rhizosphere in Tanzania. Microbiology Resource Announcements 9:e00371-20. 9(20), 1-3. https://doi.org/10.1128/MRA.00371-20.
- Aloo, B. N., Mbega, E. R., and Makumba, B. A. (2019). Rhizobacteria-based technology for sustainable cropping of Irish Potato (Solanum tuberosum L.). Potato Research. 63,157–177. https://doi.org/10.1007/s11540-019-09432-1

- 11) Chemitei, K., Makumba, B. A., Mwamburi, L. A., and Ochuodho, J. O. (2019). Bio-control of Net-blotch and Scald Pathogens of Barley using *Paenibacillus polymyxa* Kal245 isolated from Sorghum Rhizosphere in Western Kenya. *American Journal of Microbiological Research*. 7(1), 28-36. *DOI:* 10.12691/ajmr-7-1-5
- 12) Chepkwony, G., Mwamburi, L., and Makumba, B. (2019). Effect of Charcoal Filters Integrated with Moringa oleifera Seed Extracts on Microbial Population in Water from Unprotected Sources of Kapseret Division, Kenya. Advances in Microbiology 14(2):1-8
- 13) Aloo, B. N., <u>Makumba, B. A.</u>, and Mbega, E. R. (2019). The potential of Bacilli rhizobacteria for sustainable crop production and environmental sustainability. *Microbiological Research*. 219, 26-39
- 14) Mogita, W. G., Ochuodho, J. O., Gohole, L. S., Arunga, E. E., and Makumba, B. (2017). Incidence of bean anthracnose in Western Kenya and its management using aqueous extract of *Aloe vera*. *African Journal of Education, Science and Technology*, 3 (3), Pp 6-12
- 15) Pili, N. N., França, S. C., Kyndt, T.,. <u>Makumba, B. A.</u>, Skilton, R., Höfte, M., Mibey, R. K., & Gheysen, G. (2015): Analysis of fungal endophytes associated with rice roots from irrigated and upland ecosystems in Kenya. *Plant Soil. DOI 10.1007/s11104-015-2590-6*
- 16) Makumba, N. A. B., Mwaura, F. B., and E. W. Mutitu (2012): In vitro and in vivo tests of Bacillus licheniformis MGrP1 antibiotics culture filtrate as a potential biocontrol agent against bean anthracnose. East African Journal of Pure and Applied Science, 1(2) pp 1—16. ISSN: 2070-0903
- 17) Mibey K. R., Tuigong R. D., and <u>Makumba, N. A. B.</u> (2012): Dyeing of cellulose-based fabrics using dyes extracted from plants. *East African Journal of Pure and Applied Science*, 1(2) pp 17—31. ISSN: 2070-0903

Papers Presented in conferences

- Chemitei, K., <u>Makumba B. A.</u>, <u>Lizzy A. Mwamburi</u>, L. A., and <u>Ochuodho</u>, J. O. (2018). Alteration of the production of volatilizable metabolites by the rhizobacterial isolate *Paenibacillus polymyxa* using organic solvents and the effects on the antagonism towards *Drechsclera teres*. Ruforum Conference 20th—26th October 2018.
- 2) Mibey K. R., and Makumba, N. A. B. (2014): Dyeing cellulose-based-fabrics using pigments produced by fungi. Moi University 10th Annual International Conference on: Science and Technology for sustainable development. Held on: September 23rd to 29th 2014; Eldoret, Kenya. Symposium I. ISBN: 9966-854-77-0. Moi University Press. pp 191—212
- 3) **Mibey K. R., Tuigong R. D., and Makumba, N. A. B.** (2009): Fabric/Yarn dyeing using dyes extracted from locally available mushroom species. *International Conference on:*Emerging Trends in Production, Processing and Utilization of Natural Fibres. Held on: April 16th to 18th 2009; Mayfair, Worli, Mumbai, India. Book of Papers (Vol 2) pp 460—467.

Papers in Press

- Makumba, N. A. B., Kiprop, E., Mwamburi, L. A., Serrem, C., and Njira-Njira, P. (2022): Screening sorghum rhizobacteria for biological control of sorghum anthracnose in Kenya. *BMC Microbiology*. Status: Submitted for review
- Aloo, B. N, Mbega, E. R., and <u>Makumba</u>, B. A. (2022). Soil and nutritional status of main potato growing areas in differrent agroecological regions in Tanzania. *Heliyon* Status: Submitted for review

(X) Professional development Activities

The production of cheap fabrics for society and creation of employment to achieve vision 2030 through the Tamidye® project.

(XI) Service to the Community

- 1) Currently serving as the Parents Association representative for Class 7W at Queen of Angels Academy—Eldoret since the year 2016
- 2) Served as the Honorary Church Secretary since June 2013 to June 2016 at Sirikwa Pentecostal Fellowship Church, Eldoret—Kenya.

(XII) Computer skills and Competences

- Proficient in MS Office packages: Word, Excel, Powerpoint, Outlook, Access & Publisher
- Proficient in statistical analysis programmes: SPSS, SAS, Statgraphics

Other skills and competences

- Outstanding communication, evaluation, writing and reporting skills
- Exceptional microbial techniques within the laboratory and in the field
- Admirable ability to draft project proposals and forge linkages
- Extraordinary capacity to develop viable study designs
- Exceptional ability to adapt to challenging situations; excellent capacity to consult and willingness to demonstrate independent thought
- Flair for diplomacy, negotiation, conflict resolution, networking and facilitation while maintaining a firm focus on the issue of interest
- Excellent understanding of global, regional and national socioeconomic policies, political issues and the market economy, and their implications for socio-economic stability and sustainable rural livelihoods

Driving licence

Licenced to drive Class BCE vehicles; License No: ODG-131

(XIII) Referees

 Prof. Richard K. Mibey Professor of Mycology University of Nairobi

Tel: +254 722-896999 / +254 706-061999 / +254 785-701682

Email: rmibey51@gmail.com

 Prof. Lizzy Mwamburi Microbiologist/Phytopathologist University of Eldoret Tel: +254 729-205412

Email: lizzymwamburi@hotmail.com

Prof. Harrizon M. Tsingalia
 Professor of Tropical Forest Ecology and Biodiversity
 Jaramogi Oginga Odinga University of Science & Technology

Tel: +254 722-286082 Email: <u>mugatsi2005@gmail.com</u>