

James Mbora Wainaina

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APPOINTMENTS

Assistant Scientist

Woods Hole Oceanographic Institution

Faculty: The MIT-Woods Hole Oceanographic Institution

Joint Program in Oceanography

August 2024 – Current

Massachusetts, USA

Postdoctoral Researcher

The Ohio State University

Faculty Mentor: Matthew B. Sullivan

2019 – June 2023

Columbus, USA

Research Assistant

International Livestock Research Institute (ILRI)

2011-Jan 2015

Nairobi, Kenya

EDUCATION

University of Western Australia

PhD Biochemistry (Genomics and Computational biology)

Dissertation Title: *Phylogenomics of viruses and the whiteflies: Bemisia tabaci (Gennadius) (Hemiptera: Aleyrodidae), and Trialeurodes vaporariorum (Hemiptera: Aleyrodidae) found within heterogeneous agro-ecosystems of the western highlands of Kenya*
Faculty Mentor: Prof. Ian Small and Dr. Laura Boykin

Perth, Australia

2015-2019

Jomo Kenyatta University of Agriculture and Technology

Master of Science Biotechnology

Faculty Mentor: Dr Joseph K. Nganga and Dr John Waitumbi

Juja, Kenya

2008-2011

University of Nairobi

Bachelor of Science Biochemistry

Nairobi, Kenya

2004-2007

FELLOWSHIPS

- Australia Award PhD Fellowship (AUD\$ 335,989) 2015-2019
- VLIR-UOS Scholarship 2013
- Combat Disease of Poverty Consortium fellowship 2009
- Graduate Research fellowship, Walter Reed Project (WRP) 2008 -2011

AWARDS

- MBL Pioneers Endowment Fund (USD \$1,800) 2022
- OSU Microbial Communities Trainee Travel Awards (USD \$200) 2022
- American Society of Naturalists Travel grant (USD \$500) 2018
- Department of Foreign Affairs and Trade Australia (AUD \$10,000) 2016
- Combat Disease of Poverty Consortium Alumni Sponsorship 2011

PUBLICATIONS

1. Tian, F*, **Wainaina, J.M***, (*= co-first authors), Howard-Varona, C., [19 authors] 2024
Sullivan, M. B. *Prokaryotic-virus-encoded auxiliary metabolic genes throughout the global oceans*
Microbiome 12, 159 <https://doi.org/10.1186/s40168-024-01876-z>
2. Sun, C. L., Pratama, A. A., Gazitúa, M. C., Cronin, D., McGivern, B. B., **Wainaina, J. M.**, 2024
[5 authors]... Sullivan, M. B. *Virus ecology and 7-year temporal dynamics across a*
permafrost thaw gradient. *Environmental Microbiology*, 26(8), 1–25

3. Dominguez-Huerta, G., **Wainaina, J.M.**, [3 authors] Sullivan, M. B. The RNA virosphere: How big and diverse is it? *Environmental Microbiology*, 1– 7: <https://doi.org/10.1111/1462-2920.16312> 2023
4. Dominguez-Huerta, G*, Zayed, A. A*, **Wainaina, J. M.**, (* = co-first authors) Sullivan, M. B. [19 authors]. Diversity and Ecological footprint of Global Ocean RNA viruses. *Science* 376(6598), 1202–1208: <https://doi.org/10.1126/science.abn6358> 2022
5. Zayed, A. A*, **Wainaina, J. M***, Dominguez-Huerta, G.*, (* = co-first authors) Sullivan, M. B. [23 authors] Cryptic and abundant marine viruses at the evolutionary origins of Earth's RNA virome *Science* 376 (6589), 156–162. <https://doi.org/10.1126/science.abm5847> 2022
4. Pratama A.A., Bolduc B., Zayed A.A., Zhong Z.P., Guo J., Vik D.R., Gazitúa MC, **Wainaina J.M.**, Roux S, Sullivan MB. Expanding standards in viromics: in silico evaluation of dsDNA viral genome identification, classification, and auxiliary metabolic gene curation *PeerJ* 9:e11447 <https://doi.org/10.7717/peerj.11447> 2021
5. Temba, B.A., Darnell, R.E., Gichangi, A., [8 authors]., **Wainaina, J.M.**, Fletcher, M.T., Kriticos, D.J. The Influence of Weather on the Occurrence of Aflatoxin B1 in Harvested Maize from Kenya and Tanzania. *Foods*, 10, 216. <https://doi.org/10.3390/foods10020216> 2021
6. Zhong, Z.-P., Rapp, J. Z., **Wainaina, J. M.**, [5 authors] Sullivan, M. B. Viral ecogenomics of Arctic Cryope brine and sea ice *MSystems*,5(3).<https://doi.org/10.1128/mSystems.00246-20> 2020
7. **Wainaina J.M.** , Kubatko, L., [8 authors] Evolutionary insights into Bean common mosaic necrosis virus and Cowpea aphid borne mosaic virus using global isolates and thirteen new near complete genomes from Kenya *PeerJ* 7:e6297 <https://doi.org/10.7717/peerj.6297> 2019
8. **Wainaina J.M.**, Ateka E., Makori T., Kehoe M.A., Boykin L.M [5 authors] A metagenomic study of DNA viruses from samples of local varieties of common bean in Kenya. *PeerJ* 7:e6465 <https://doi.org/10.7717/peerj.6465> 2019
9. **Wainaina J.M.**, Ateka, E., Makori, T., Kehoe, M Boykin, L. M Phylogenomic relationship and evolutionary insights of sweet potato viruses from the western highlands of Kenya *PeerJ* 6:e5254 <https://doi.org/10.7717/peerj.5254> 2018
10. **Wainaina, J.M.**, Ateka, E., Makori, T., Kehoe, M. Boykin, L. M. Genomic characterization evolutionary relationships of groundnut rosette virus from the western highlands of Kenya *Journal of Plant Pathology* <https://doi.org/10.1007/s40858-018-0240-2> 2018
11. Sseruwagi, P*, **Wainaina, J***, [11 authors] (*= co-first authors). The first transcriptomes from field-collected individual whiteflies (*Bemisia tabaci*, Hemiptera: Aleyrodidae): a case study of the endosymbiont composition *Gates Open Res.* <https://doi.org/10.12688/gatesopenres.12783.3> 2018
12. Boykin, L. M., Kinene, T., **Wainaina, J. M.**, [14 authors]. Review and guide to a future naming system of African *Bemisia tabaci* species, *Systematic Entomology* <https://doi.org/10.1111/syen.12294> 2018
13. Boykin L, [4 authors]., **Wainaina, J.M.**,[20 authors] Real time portable genome sequencing for global food security *F1000 Research*, 7:110 <https://doi.org/10.12688/f1000research.15507.1> 2018
14. Gachara, G.W., Nyamache, A.K., Harvey, J Gnonlonfin, G.B., **Wainaina, J. M** . Genetic diversity of *Aspergillus flavus* and occurrence of aflatoxin contamination in stored maize across three agro- ecological zones in Kenya. *Agric & Food Secur* 7, 52. <https://doi.org/10.1186/s40066-018-0202-4> 2018
15. Darnell R. E., Harvey, J.J., Fox. G. P., Fletcher M.T., **Wainaina J.** Wanjuki I. Turner W. J [7 authors] NIRS Calibration of Aflatoxin in Maize *Australian Journal of Chemistry* 71, 868- 873.<https://doi.org/10.1071/CH18316> 2018
16. Rossitto De Marchi. B., Kinene T., **Wainaina, JM**, Krause-Sakate R, Boykin L Comparative transcriptome analysis reveals genetic diversity in the endosymbiont *Hamiltonella* between native and exotic populations of *Bemisia tabaci* 2018

from Brazil. PLOS ONE 13(7): e0201411. <https://doi.org/10.1371/journal.pone.0201411>

17. **Wainaina, J. M.**, De Barro, P., Kubatko, L., Kehoe, M. [4 authors] Genetic Diversity, Population structure and Gene flow estimation of *Trialeurodes vaporariorum* (Greenhouse whitefly). *Bulletin of Entomological Research Bull Entomol Res.*Feb;108(1):5-13. <https://doi.org/10.1017/S0007485317000360> 2017
 18. Manzo, F., [3 authors], **Wainaina, J** [7 authors] Potential of using host plant resistance, and phosphorus fertilizers for reduction of *Aspergillus flavus* colonization and aflatoxin accumulation in maize in Tanzania *Field Crops Research* 99-105 <https://doi.org/10.1016/j.cropro.2016.11.021> 2017
 19. Marijani, E., **Wainaina, J. M.** [8 authors] Mycoflora and mycotoxins in finished fish feed and feed ingredients from smallholder farms in East Africa *The Egyptian Journal of Aquatic Research* 43 (2):169-176 <https://doi.org/10.1016/j.ejar.2017.07.001> 2017
 20. Mutiga, S. K., Morales, L., Angwenyi, S., **Wainaina, J.**, Harvey, J., Biswanath, D., & Nelson, R. J. [7 authors] Association between agronomic traits and aflatoxin accumulation in diverse maize lines grown under two soil nitrogen levels in Eastern Kenya. *Field Crops Research*, 205, 124-134 <https://doi.org/10.1016/j.fcr.2017.02.007> 2017
 21. Mbae, C., Mulinge, E., Guleid, F., **Wainaina, J.**, [7 authors]. Molecular Characterization Of *Giardia duodenalis* in Children in Kenya *BMC Infectious Diseases*, 16:135 <http://doi.org/10.1186/s12879-016-1436-z> 2016
 22. Adedokun, O. M., Kyalo, M., Gnonlonfin, B., **Wainaina, J.**, [9 authors] Mushroom: molecular characterization of indigenous species in the Niger Delta Region of Nigeria *European Journal of Horticultural Science*, 81(5), 273-280 https://www.pubhort.org/ejhs/81/5/6/81_5_6.pdf 2016
 23. Mbae C, Mulinge E, Waruru A, Ngugi B, **Wainaina J**, Kariuki S. [6 authors] Genetic Diversity of *Cryptosporidium* in Children in an Urban Informal Settlement of Nairobi, Kenya. *PloS One*. 21;10(12):e0142055 <https://doi.org/10.1371/journal.pone.0142055> 2015
 24. Chauhan Y, Tatnell J, Krosch S, Karanja J, Gnonlonfin B, Wanjuki I, **Wainaina J.**, Harvey J. [8 authors] An improved simulation model to predict pre-harvest aflatoxin risk in maize. *F Crop Res.*;178: 91–99. <https://doi.org/10.1016/j.fcr.2015.03.024> 2015
 25. Mutai BK, **Wainaina JM**, Magiri CG, Nganga JK, Ithondeka PM, Njagi ON, [9 authors] et al. Zoonotic surveillance for rickettsiae in domestic animals in Kenya. *Vector-Borne Zoonotic Dis.* 2013;13. <https://doi.org/10.1089/vbz.2012.0977> 2013
 26. Kana JR, Gnonlonfin BGJ, Harvey J, **Wainaina J**, Wanjuki I, Skilton RA, et al., [7 authors] Assessment of aflatoxin contamination of maize, peanut meal, and poultry feed mixtures from different agroecological zones in Cameroon. *Toxins (Basel)*. 2013;5 <https://doi.org/10.3390/toxins5050884> 2013
- Book chapters:**
27. Tonny Kinene, **James Wainaina**, Solomon Maina Laura M. Boykin *Rooting Phylogenetic tree* The Encyclopedia of Evolutionary Biology 1st Edition Editor-in-Chiefs: Richard Kliman Hardcover ISBN: 9780128000496 2016

SCIENTIFIC CONFERENCE PRESENTATIONS

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| Center of Microbiology (CoMS) Midwest Conference Columbus USA Contributed Poster | 2023 |
| <i>“Title: Cryptic and abundant marine viruses at the evolutionary origins of Earth’s RNA virome”</i> | |
| Infectious Disease Institute (IDI)/WIP seminar series Columbus USA Invited Talk | 2022 |
| <i>“Title: Cryptic and abundant marine viruses at the evolutionary origins of Earth’s RNA virome”</i> | |
| Infectious Disease Institute (IDI)/Center of Microbiology (CoMS) Columbus USA Invited Talk | 2022 |
| <i>“Title: Cryptic and abundant marine viruses at the evolutionary origins of Earth’s RNA virome”</i> | |
| TARA Ocean Seminar series Virtual Invited Talk | 2021 |
| <i>“Title 100-fold increase in known cyanophage and 1500 novel cyanophages in the Global Ocean Virome dataset 2.0”</i> | |

Mathematical Biosciences Institute (MBI) Seminar Series Columbus USA Invited Talk Title: “Towards a comprehensive global oceans catalog of viral ‘auxiliary metabolic genes’”	2020
II Joint Congress on Evolutionary Biology Montpellier France Contributed Poster Title: “Phylogenomics and evolutionary insights of Bean common mosaic necrosis virus and Cowpea aphid borne mosaic virus”	2018
International Whitefly Symposium Arusha Tanzania Invited Talk Title: “Phylogenomics of Bemisia tabaci species complex in common bean (Phaseolus vulgaris) mixed cropping systems of Kenya”	2016
Australasia plant virology workshop Freemantle Australia Invited Talk Title: “Viral Identification in whitefly (Bemisia tabaci) and common bean (Phaseolus vulgaris) in Kenya”	2015
United States Africa Command (EUCOM/AFRICOM) Stuttgart Germany Invited Talk Title: Surveillance of Rickettsia infection in domestic animals presented for slaughter to Major Slaughterhouses in Kenya”	2011
Combat Disease of Poverty consortium: sub theme One Health Kampala Uganda Invited Talk Title: “Surveillance of Rickettsia infection in domestic animals presented for slaughter to Major Slaughterhouses in Kenya”	2010

MENTORSHIP & RESEARCH SUPERVISORY EXPERIENCE

Undergraduate student Mentor Ohio State University Student name: Minh Paratam Project: Global Cyanophage ecogenomics Program: Ohio Five-Ohio State University Summer Undergraduate Research Experience (SURE) program Student name: Erica Britta Project: Global Cyanophage ecogenomics Program: Ohio Five-Ohio State University Summer Undergraduate Research Experience (SURE) program	Summer- 2022-2021
Graduate student Mentor Ohio State University Student name: Funing Tian Project: Cataloging of auxiliary metabolic gene from global ocean virome dataset 2.0	2019-2024
Graduate student Mentor University of Western Australia Student name: Tonny Kinene Project: Genome sequencing and data analysis of insect vectors (whitefly and associated viruses)	2015-2018
Visiting Scientist Mentor International Livestock Research Institute Name: Mrs. Esther Marijani (Country: Tanzania) Project: Mycotoxin detection in fish feed Outcome: 2 peer reviewed publication and graduated from the University of Nairobi Name: Mr. Ben Temba (Country: Tanzania/Australia) Project: Aflatoxin detection in maize from Kenya and Tanzania Outcome: 1 peer reviewed publication and PhD graduation from the University of Queensland, Australia Name: Miss Grace Gacheru (Country: Kenya) Project: Aflatoxin detection in stored maize across agro-ecological zones in Kenya Outcome: 1 peer reviewed publication and graduated with a Master of Science from Kenyatta University Kenya Name: Mr. Fabian Manzo (Country: Tanzania) Project: Aflatoxin detection across maize field trials in Kenya and Tanzania. Outcome: 1 peer reviewed publication and graduated with a Master of Science from the University of Dar es Salaam, Tanzania	2011-2015

Name: Yemisirach Mulugeta Mamo (Country: Ethiopia)
Project: Molecular characterization of fungi and bacteria endophytes associated with Enset ventricosum
Outcome: PhD Graduation from the Addis Ababa University, Ethiopia

Name: Dr. Raphael J Kana (Country: Cameroon)
Project: Mycology and Mycotoxin detection in animal feeds
Outcome: 2 peer reviewed publication

Name: Oletayo Adedokun (Country: Nigeria)
Project: Molecular characterization of molecular characterization of wild mushrooms from Nigeria
Outcome: 1 peer reviewed publication

TEACHING EXPERIENCE

Guest Lecturer Ohio State University	2024
<i>Course: 7th International Viromics Workshop</i>	
Teaching Assistant The Ohio State University	2021-2023
<i>Course: MICRBIO 6155 – Microbiome Science</i>	
<i>Course: MICROBIO 8161-Microbiome Informatic course</i>	
Lecturer Jomo Kenyatta University of Agriculture and Technology	2011
<i>Course: Bioinformatics and Animal parasitology</i>	

PROFESSIONAL DEVELOPMENT

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| • MBL Molecular Evolution Workshop | Woods Hole, MA, USA 2022 |
| • Team Science Workshop | The Ohio State University 2021 |
| • Microbiome Informatics Webinar Series | The Ohio State University 2021 |
| • Bayesian Statistical training: Taming the BEAST2 | Waiheke Island, New Zealand 2017 |

PROFESSIONAL SERVICE

Manuscript and Grant Reviewer

- Scientific Reports
- Frontiers in Virology
- Bioinformatics
- ISMEJ
- Ecology and Evolution
- PLoS Pathogen
- Environmental Microbiome
- External reviewer for grants at The Natural Environment Research Council (NERC) (UK)
- Nature Microbiology
- Nature ecology and evolution

PROFESSIONAL MEMBERSHIP

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| • Association for the Sciences of Limnology and Oceanography | 2024-Present |
| • Society for the Study of Evolution | 2016 - Present |
| • Center for Microbiology | 2021 - Present |

COMMUNITY ENGAGEMENT

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|---|--------------|
| • TARA Ocean Seminar Series committee member | 2021-present |
| • Young Scientists Tanzania (YST) and student mentor | 2012-todate |
| • University of Western Australia (UWA) Postgraduate mentor | 2016-2018 |