

# Thumbi Mwangi, BVM, MSc, Ph.D

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## Education/Training

**2012 - 2013:** Post-doctoral Research training, **Washington State University, US.**

**2008 - 2012:** Ph.D. Infectious Diseases Epidemiology, **University of Edinburgh, UK.**

**2005 - 2008:** MSc Genetics and Animal breeding, **University of Nairobi, Kenya.**

**2000 - 2005:** Bachelor of Veterinary Medicine & Surgery, **University of Nairobi, Kenya.**

## Professional experience

**2016- to-date:** **Wellcome Trust Public Health and Tropical Medicine Fellow** - Center for Global Health Research, *Kenya Medical Research Institute.*

**2015- to-date:** **Clinical Assistant Professor** - Paul G. Allen School for Global Animal Health, *Washington State University*

**2013- to-date:** **Visiting Lecturer** - University of Nairobi Institute of Tropical and Infectious Diseases (UNITID), and Wangari Maathai Institute for Environmental Studies and Peace, College of Agriculture and Veterinary Sciences, *University of Nairobi.*

**2013- 2014:** **Assistant Research Professor** - Paul G. Allen School for Global Animal Health, *Washington State University* and One-Health Program Center for Global Health Research, *Kenya Medical Research Institute.*

**2012- 2013:** **Post-doctoral research associate** - Paul G. Allen School for Global Animal Health, *Washington State University* and Integrated Human Animal Health Program *KEMRI/CDC Research and Public Health Collaboration.*

**2008-2010:** **Field team leader** - Infectious Diseases of East Africa Livestock (IDEAL) project *University of Edinburgh.*

**2008:** **Visiting Scientist and Veterinary consultant** - International Livestock Research Institute (*ILRI*).

**2006-2007: Graduate fellow** - Biosciences eastern and central Africa (*BecA*), ILRI.

**2005-2006: Graduate assistant** - Faculty of Veterinary Medicine, *University of Nairobi*.

#### *Achievement Awards*

- The **2017** Affiliate Fellow of the African Academy of Sciences.
- The **2016** New Voices Fellowship in Global Health Award by the Aspen Institute, US.
- **The 2016** Business Daily Top 40 under 40 Kenya Award
- **The 2015** Award for Outstanding Research Articles in Biosurveillance - Scientific Achievement Category (First Place). Awarded by the International Society for Disease Surveillance (ISDS).
- **The 2015** Veterinarian of the Year (VOYA) Award - Research Category. Awarded by the Kenya Veterinary Association (KVA).
- **2013** Grand Challenge Exploration Award (Round 11). Awarded by the Bill and Melinda Gates Foundation.

#### *Grants and fellowship awards*

##### **Grants Awarded**

- June 2017: **\$ 36,000 for 6 months** grant from World Health Organization. Topic: Rabies Post-Exposure Prophylaxis demand and Forecasting in Kenya (Role: Principal Investigator).
- May 2017: **\$ 1,910,000 for 3 years** grant from US-DOD DTRA. Topic: Identifying anthrax hotspots and associated ecological factors in Kenya (Role: Co-investigator).
- April 2017: **\$ 750,000 for 2 years** grant from UK Medical Research Council, Global Challenges Research Fund (GCRF) Foundation Awards. Topic: Drinking-water under a "One Health" lens: quantifying microbial contamination pathways between livestock and drinking-water - (Role: Co-PI).
- September 2016: **\$ 50,000 for 1 year** grant from World Health Organization and Global Alliance for Vaccines and Immunization (WHO/GAVI). Topic: Vaccine Initiative Learning Agenda: Rabies Surveillance and burden estimates, Kenya) - (Role - Principal investigator).
- April 2016: **\$ 608,000 for 3 years** Research Fellowship in Public Health and Tropical Medicine, Wellcome Trust Foundation, UK. Topic: Applying epidemiological techniques to improve visibility and control of neglected zoonotic diseases: the case of rabies elimination in Kenya (Role - Principal investigator).

- August 2016: **\$ 394,000 for 2016/2017 year** Research funding from Paul G Allen Family Foundation, through Washington State University. Topic: Enhancing Child Nutrition and Growth through targeted livestock interventions in Kenya (Role: co-Principal investigator).
- September 2015: **\$500,000 annually for 5 years** - Center for Disease Control and Prevention - Global Health Security Agenda. Preventing Zoonotic Diseases in Kenya (Role: Co-investigator).
- May 2015: **\$ 240,000** Wellcome Trust Foundation, United Kingdom. Funding to support 12 months Masters Fellowship in Public Health and Tropical Medicine in London School for Hygiene and Tropical Medicine, and a further 18 months research fellowship on topic "Deworming prior to vaccination: Are there immunological benefits of deworming calves before vaccinating them against East Coast Fever (ECF) using Infection Treatment Method (ITM)?" (Role: Mentor to grant Awardee Dr. Robert Ndung'u).
- November 2013: **\$ 100,000** Grand Challenge Exploration Award - Bill and Melinda Gates Foundation. The control of syndemic diseases: reducing burden of malaria in humans and East Coast fever in cattle through worm control. (Role: Principal investigator).
- April, 2011: **\$ 36,000** International Fellowship in Graduate Research for the Adapting Livestock Systems to Climate Change - funded by USAID Climate Change program. (Role: Co-applicant with Dr. Mark Nanyingi and Prof. Kiama Gitahi, University of Nairobi, Kenya).
- February, 2011: **\$ 9,600** Davies Biological Science Expenditure Award, University of Edinburgh. (Role: Co-applicant with Dr. Juan Carlos Ruiz Guarjardo - University of California, Davis).
- April 2009: **\$ 30,400** Overseas Research Students Award , Scottish Funding Council (Role: Principal applicant)

#### Fellowships and scholarships

- **April 2016: Research Training Fellowship** -funded by Wellcome Trust - to work implementation science for rabies elimination in Kenya. Mentors from the University of Glasgow, Kenya Medical Research Institute and Washington State University.
- **January 2016: Aspen New Voices Fellowship** - awarded by the Aspen Institute, Washington DC, US.
- **September 2008: PhD scholarship** -funded by Wellcome Trust - through Prof. Mark Woolhouse, University of Edinburgh.

- **October 2006: Graduate fellowship**, funded by Association for Strengthening Agriculture Research in East and Central Africa (ASARECA), to work at the Biosciences eastern and central Africa (BecA hub), International Livestock Research Institute.
- **September 2005: Graduate Scholarship**, University of Nairobi. To undertake a Masters in Science in Genetics and Animal Breeding, Faculty of Veterinary Medicine.

## Teaching experience

- Teaching *R-programming for Statistical Analysis* courses at the University of Nairobi Institute of Tropical and Infectious Diseases (2016), at the Kenya Medical Research Institute (2013, 2014, 2015)
- Concepts of Epidemiology - Doctor of Veterinary Medicine students, Washington State University - 2015
- Guest Lecturer - Kenya Field Epidemiology and Laboratory Training Program - Lecture on *Emerging and Re-emerging zoonotic diseases* - 2014, 2015
- Teaching the course *WMI 606: Research Methods for the Masters Program*, Wangari Maathai Institute for Environmental Studies and Peace, College of Agriculture and Veterinary Sciences, *University of Nairobi*. - 2014, 2015, 2016
- Graduate tutor - *Introduction to Quantitative Genetics* - 2nd and 3rd year Bachelor of Veterinary Medicine students, University of Nairobi - 2005/2006.

## Publications

### *Published journal articles*

1. Mosites E, Aol G, Otiang E, Bigogo G, Munyua P, Montgomery JM, Neuhouser ML, Palmer GH, **Thumbi SM** (2017) Child height gain is associated with consumption of animal-source foods in livestock-owning households in Western Kenya. *Public Health Nutr.* Feb;20(2):336-345
2. Muema J, **Thumbi SM**, Obonyo M, Wanyoike S, Nanyingi M, Osoro E, Bitek A, Karanja S. (2017) Seroprevalence and Factors Associated with *Coxiella burnetii* Infection in Small Ruminants in Baringo County, Kenya. *Zoonoses Public Health.* Jan 24. doi: 10.1111/zph.12342
3. Mosites E, Sammons M, Otiang E, Eng A, Noecker C, Manor O, Hilton S, **Thumbi SM**, Onyango C, Garland-Lewis G, Call DR, Njenga MK, Wasserheit JN, Zambriski JA, Walson JL, Palmer GH, Montgomery J, Borenstein E, Omoro R, Rabinowitz PM (2017) Microbiome sharing between children, livestock and household surfaces in western Kenya. *PLoS One.* Feb 2;12(2):e0171017. doi: 10.1371/journal.pone.0171017.

4. Nanyingi MO, Muchemi GM, **Thumbi SM**, Ade F, Onyango CO, Kiama SG, Bett B. (2017) Seroepidemiological Survey of Rift Valley Fever Virus in Ruminants in Garissa, Kenya. *Vector Borne Zoonotic Dis.* Feb;17(2):141-146. doi: 10.1089/vbz.2016.1988.
5. Munyua P, Bitek A, Osoro E, Pieracci EG, Muema J, Mwatondo A, Kungu M, Nanyingi M, Gharpure R, Njenga K, **Thumbi SM** (2016) Prioritization of Zoonotic Diseases in Kenya, 2015 *PLoS One.* Aug 24; 11 (8):e0161576.
6. Mosites E, **Thumbi SM**, Otiang E, McElwain TF, Njenga MK, Rabinowitz PM, Rowhani-Rahbar A, Neuhaus ML, May S, Palmer GH, Walson JL (2016) Relations between Household Livestock Ownership, Livestock Disease, and Young Child Growth. *J Nutr.* May; 146(5):1118-24.
7. Callaby R, Toye P, Jennings A, **Thumbi SM**, Coetzer JA, Conradie Van Wyk IC, Hanotte O, Mbole-Kariuki MN, Bronsvoort BM, Kruuk LE, Woolhouse ME, Kiara H. (2016) Seroprevalence of respiratory viral pathogens of indigenous calves in Western Kenya. *Res Vet Sci.* Oct;108:120-4. doi: 10.1016/j.rvsc.2016.08.010.
8. Gitonga PN, Gachene CK, Njoroge E, **Thumbi SM** (2016) Small ruminant husbandry practices amongst Kajiado and Marsabit pastoralists and their effects on Peste des petits ruminants control strategies. *Livestock Research for Rural Development* 28 (2)
9. Munyua PM, Murithi RM, Ithondeka P, Hightower A, **Thumbi SM**, Anyangu SA, Kiplimo J, Bett B, Vrieling A, Breiman RF, Njenga MK (2016) Predictive Factors and Risk Mapping for Rift Valley Fever Epidemics in Kenya. *PLoS One.* Jan 25; 11(1): e0144570
10. **Thumbi SM**, Njenga M.K, Marsh T.L, Noh S, Otiang E, Munyua P, Ochieng L, Ogola E, Yoder J, Audi A et al (2015) Linking human health and livestock health: a "One-Health" platform for integrated analysis of human health, livestock health, and economic welfare in livestock dependent communities. *PLoS One* Mar 23; 10(3): e0120761. PMID: PMC4370696
11. Woolhouse M.E.J, **Thumbi SM**, Jennings A, Chase-Topping M, Callaby R., Kiara H, Oosthuizen M.C, Mbole-Kariuki M.N, Conradie I, Handel I.G, Poole EJ, Njiiri E, Collins NE, Murray G, Tapio M, Auguet OT, Weir W, Morrison WI, Kruuk LE, Bronsvoort BM, Hanotte O, Coetzer K, Toye PG. (2015) Co-infection protects against mortality due to parasite infection. *Science Advances.* Mar 20; 1(2):e1400026
12. Omulo S, **Thumbi SM**, Njenga MK, Call DR (2015) A review of 40 years of enteric antimicrobial resistance research in Eastern Africa: what can be done better? *BMC Antimicrobial Resistance and Infection Control* 4:1. PMID: PMC4339253
13. Mosites EM, Rabinowitz PM, **Thumbi SM**, Montgomery JM, Palmer GH, May S, Rowhani-Rahbar A, Neuhaus ML, Walson JL (2015) The Relationship between Livestock Ownership and Child Stunting in Three Countries in Eastern Africa Using National Survey Data, *PLoS One* Sep 11;10(9):e0136686

14. Njenga MK, Njagi L, **Thumbi SM**, Kahariri S, Githinji J, Omondi E, Baden A, Muriithi M, Paweska J, Ithondeka P, Ngeiywa KJ, Dungu B, Donadeu M, Munyua PM (2015) Randomized controlled field trial to assess the immunogenicity and safety of Rift Valley fever Clone 13 vaccine in livestock. *PLoS Negl Trop Dis* Mar 10; 9(3): e0003550. PMID: PMC4355591
15. Osoro E, Munyua P, Omulo S, Ogola E, Ade F, Mbatha P, Mbabu M, Ng'ang'a Z, Kairu S, Maritim M, **Thumbi SM**, Bitek A, Gaichugi S, Rubin C, Njenga K, Guerra M (2015) Strong association between human and animal brucella seropositivity in a linked study in Kenya, 2012–2013. *American Journal of Tropical Medicine & Hygiene* Aug;93(2):224-31
16. Nanyingi MO, Munyua P, Kiama SG, Muchemi GM, **Thumbi SM**, Bitek AO, Bett B, Muriithi RM, Njenga MK (2015) A systematic review of Rift Valley Fever epidemiology 1931-2014, *Infect Ecol Epidemiol*. Jul 31; 5:28024.
17. Njiiri NE, Bronsvoort BM, Collins NE, Steyn HC, Troskie M, Vorster I, **Thumbi SM**, Sibeko KP, Jennings A, van Wyk IC, Mbole-Kariuki M, Kiara H, Poole EJ, Hanotte O, Coetzer K, Oosthuizen MC, Woolhouse M, Toye P (2015) The epidemiology of tick-borne haemoparasites as determined by the reverse line blot hybridization assay in an intensively studied cohort of calves in western Kenya. *Vet Parasitol*. May 30;210(1-2):69-76
18. Callaby R, Hanotte O, Conradie Van Wyk I, Kiara H, Toye P, Mbole-Kariuki MN, Jennings A, **Thumbi SM**, Coetzer JA, de C Bronsvoort BM, Knott SA, Woolhouse ME, Kruuk LE (2015) Variation and covariation in strongyle infection in East African shorthorn zebu calves. *Parasitology*. Mar; 142 (3): 499-511
19. **Thumbi SM**, Bronsvoort BMDC, Poole EJ, Kiara H, Toye PG, Mbole-Kariuki MN, Conradie I, Jennings A, Handel IG, Coetzer JAW, Steyl JCA, Hanotte O, Woolhouse MEJ: (2014) Parasite co-infections and their impact on survival of indigenous cattle. *PLoS One*, 9:e76324
20. **Thumbi SM**, Bronsvoort, M., Poole, J., Kiara, H., Handel, I., Jennings, A.E., Conradie van Wyk, I., Ndila, M., Toye, P.G., Hanotte, O., Coetzer, J. and Woolhouse, M. (2013) Parasite co-infections show synergistic and antagonistic interactions on growth performance of East African zebu cattle under one year. *Parasitology*, Sep; 4: 1:10
21. **Thumbi SM**, Bronsvoort, M., Poole, J., Kiara, H., O., Handel, I., Jennings, A.E., Conradie van Wyk, I., Ndila, M., Toye, P.G., Hanotte, O., Coetzer, J. and Woolhouse, M. (2013) Mortality in zebu cattle under one year: predictors of infectious-disease mortality. *BMC Veterinary Research*, 9:175
22. Kiara H, A. Jennings, M. Bronsvoort, I. Handel, **Thumbi SM**, M. Mbole-Kariuki, I. Conradie, J. Poole, O. Hanotte, M. Woolhouse, P. Toye. (2014) A longitudinal

- assessment of the serological response to *Theileria parva* and other tick-borne parasites from birth to one year in a cohort of indigenous calves in western Kenya. *Parasitology* Sep; 141(10):1289-98
23. Mbole-Kariuki MN, Sonstegard T, Orth A, **Thumbi SM**, Bronsvort BM, Kiara H, Toye P, Conradie I, Jennings A, Coetzer K, Woolhouse ME, Hanotte O, Tapio M (2014) Genome-wide analysis reveals the ancient and recent admixture history of East African Shorthorn Zebu from Western Kenya. *Heredity* (Edinb). Oct; 113(4):297-305.
  24. Van Wyk IC, Goddard A, de C Bronsvort BM, Coetzer JA, Handel IG, Hanotte O, Jennings A, Lesosky M, Kiara H, **Thumbi SM**, Toye P, Woolhouse MW, Penzhorn BL (2014) The impact of co-infections on the haematological profile of East African Short-horn Zebu calves. *Parasitology*. Mar;141(3):374-88
  25. Murray GG, Woolhouse ME, Tapio M, Mbole-Kariuki MN, Sonstegard TS, **Thumbi SM**, Jennings AE, van Wyk IC, Chase-Topping M, Kiara H, Toye P, Coetzer K, deC Bronsvort BM, Hanotte O (2014) Genetic susceptibility to infectious disease in East African Shorthorn Zebu: a genome-wide analysis of the effect of heterozygosity and exotic introgression. *BMC Evol Biol* Nov 9; 13:246
  26. de Clare Bronsvort BM, **Thumbi SM**, Poole EJ, Kiara H, Auguet OT, Handel IG, Jennings A, Conradie I, Mbole-Kariuki MN, Toye PG, Hanotte O, Coetzer JA, Woolhouse ME (2013) Design and descriptive epidemiology of the Infectious Diseases of East African Livestock (IDEAL) project, a longitudinal calf cohort study in western Kenya. *BMC Vet Res*. Aug 30;9: 171
  27. Toye P, Handel I, Gray J, Kiara H, **Thumbi SM**, Jennings A, van Wyk IC, Ndila M, Hanotte O, Coetzer K, Woolhouse M, Bronsvort M (2013) Maternal antibody uptake, duration and influence on survival and growth rate in a cohort of indigenous calves in a smallholder farming system in western Kenya. *Vet Immunol Immunopathol*. Sep 1; 155(1-2): 129-34
  28. Toye PG, Batten CA, Kiara H, Henstock MR, Edwards L, **Thumbi SM**, Poole EJ, Handel IG, Bronsvort BM, Hanotte O, Coetzer JA, Woolhouse ME, Oura CA (2013) Bluetongue and epizootic haemorrhagic disease virus in local breeds of cattle in Kenya. *Res Vet Sci*. Jun; 94(3): 769-73
  29. Lesosky M, Dumas S, Conradie I, Handel IG, Jennings A, **Thumbi SM**, Toye P, Bronsvort BM. (2013) A live weight-heart girth relationship for accurate dosing of east African shorthorn zebu cattle. *Trop Anim Health Prod*. Jan; 45(1): 311-6
  30. van Wyk IC, Goddard A, de C Bronsvort BM, Coetzer JA, Booth C, Hanotte O, Jennings A, Kiara H, Mashego P, Muller C, Pretorius G, Poole EJ, **Thumbi SM**, Toye PG, Woolhouse ME, Penzhorn BL (2012) Hematological profile of East African short-horn zebu calves from birth to 51 weeks of age. *Comp Clin Path*. Jun 1; 22: 1029-1036

31. Amimo J.O., **Thumbi SM** Inyangala B., Jung' J., Mosi R (2011) Socio-economic characteristics and perceptions of cattle keepers and constraints to cattle production in Western Kenya, *Livestock Research for Rural Development*, 23(6)
32. **Thumbi SM**, Junga J., Mosi R., McOdimba F (2010) Spatial distribution of African Animal Trypanosomiasis in Suba and Teso districts in Western Kenya, *BMC Res Notes*. Jan 15; 3:6
33. **Thumbi SM**, Mosi R., McOdimba F., Junga J (2008) Comparative evaluation of three PCR based diagnostic assays for the detection of pathogenic trypanosomes in cattle blood, *Parasite and Vectors*. Dec 24:1(1): 46

### *Public and Media Engagement*

- May 2017: The Conversation Africa article Title and link: [Here's how to prevent another anthrax outbreak in Kenya.](#)
- November 2016: Op-ed piece in the Nation Newspapers Title and link: [News of Research Funding Welcome.](#)
- October 2016: The Conversation Africa article Title and link: [Better livestock policies in Africa offer a pathway out of poverty.](#)
- September 2016: Article titled "[Sustaining the drive towards rabies elimination in Kenya](#)" appearing in the "Rabid Bytes: The Global Alliance for Rabies Control Newsletter (September 2016, Issue 49)".
- August 2016: Op-ed piece in the Nation Newspapers Title and link: [Why we must tackle neglected diseases.](#)
- May 2016: Standard Media Newspapers Title and link: [Kenya should step up her bioterrorism surveillance.](#)
- April 2016: Huffington Post article Title and link: [Rabies Just Can't Get Any Respect.](#)
- October 2015: Kenya Television Network: providing expert opinion during a prime time news Health Feature broadcast on [Rabies Disease and its elimination in Kenya.](#)
- May 2015: The East African regional newspaper. An article featuring my research work on links between animal health and human health. Title and link: ["People are catching bugs from domestic animals - study."](#)
- May 2015: The Standard Newspaper, Kenya. An opinion article on Cholera outbreaks and how to prevent them in Kenya. Title and link: ["Kenya must now do what London did 150 years ago to keep deadly disease at bay."](#)
- May 2015: Washington State University News. Coverage of my research article on links between animal health and human health. Title and link: ["Humans, livestock in Kenya linked in sickness in health."](#)

- May 2015: Infectious Disease News. Coverage of my research article on links between animal health and human health. Title and link: [“Strong One-Health Connection exists between humans and livestock.”](#)
- April 2015: The Standard Newspaper, Kenya - media coverage on my research linking animal health to human health. Title and link: [“is your livestock down with disease? Worry about your health too.”](#)
- March 2015: The Standard Newspaper, Kenya. Contributed to an article on Rift Valley fever disease, Title and link: [“Researchers closer to better control of killer animal disease.”](#)
- March 2015: Our research article on Parasite Co-infections published in the journal *Scientific Advances* is covered by several online news outlets.
  - Washington State University website: link: [Cattle-Killer: Two Parasites are better than one.”](#)
  - EurekAlert - The Global Source for Science News (AAAS): link: [Two parasites are better than one.”](#)
  - Capital Press. [“Parasites protect cattle from disease.”](#)
  - Science World Report: see link: [Two Parasites Are Better Than One: Co-infection Reduces Cattle-Death.”](#)
- February 2015: The Standard Newspaper, Kenya - an opinion article on Antimicrobial Resistance. Title and link: [“Hope for patients as scientists discover antibiotic to treat drug resistant TB.”](#)
- Media coverage on Rabies:
  - October 2014: Wrote an online article to the Global Alliance for Rabies Control, Title and link: [“Towards a Rabies-free Kenya, Kenya takes the bold step.”](#)
  - October 2014: Wrote article on rabies for The Standard Newspapers, Kenya. Title and link: [“Kenya takes lead in keeping deadly rabies at bay in Africa.”](#)

### *Membership*

- Member, Zoonotic Technical Working Group (ZTWG), Kenya
- Member, International Society for Disease Surveillance (ISDS)
- Member of the American Society of Tropical Medicine and Hygiene
- Member of the steering committee for the Eastern Africa Regional Conference on Zoonotic Diseases
- Member, Center Scientific Review Committee - Center for Global Health Research, Kenya Medical Research Institute
- Member, technical committee that developed the Kenya Rabies Elimination Strategy
- Member, Kenya Veterinary Association

## Leadership roles

- 2017 - Editor-in-chief, Journal of Veterinary Medicine and One Health, Scientific Journal of the Kenya Veterinary Association.
- 2016 - Scientific committee, The Kenya Veterinarian, Scientific Journal of the Kenya Veterinary Association
- 2008 - Board Member, iServe Africa organisation
- 2004-2005: Served as the Kenya Veterinary Students Association Chair
- 2003 -2004: Editor of the Veterinary Students Association - VetDigest Magazine

## References

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