

BERNARD ACHERO OKECH, MS, PHD

Brief Introduction:

I am a Research Assistant Professor and Graduate Faculty at the University of Florida, College of Public Health and Health Professions, where I conduct research on and teach medical entomology (see publication record). My research career (>15 years) centers on in-depth scientific investigations on environmental factors, mosquito vector biology and the pathogens they transmit to discover new knowledge that can be used to develop vector borne disease control tools. I have developed a vibrant research program focusing on global health while inspiring, motivating and mentoring a diverse body of students and colleagues who I interact with in the course of my work.

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EDUCATION AND TRAINING

1. **May, 2005–Jun, 2007:** Postdoctoral – Mosquito Membrane Physiology, University of Florida, US
2. **Mar, 2004–Mar, 2005:** Postdoctoral – Medical Entomology, Jichi Medical University, Tokyo, Japan
3. **Sept, 1999–Dec, 2004:** Doctor of Philosophy, Medical Entomology, Kenyatta University, Nairobi, Kenya
4. **Aug, 1995–Dec, 1998:** Master of Science, Medical Parasitology, University of Nairobi, Nairobi, Kenya
5. **Sept, 1990–Oct, 1995:** Bachelor of Science (Honors) Biological Sciences, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

DOCTORAL AND MASTERS DEGREES DISSERTATION TOPIC

PhD Thesis: Environmental factors affecting the development of *Plasmodium falciparum* in *Anopheles gambiae* mosquitoes. Advisor: Prof. John C. Beier/Dr. John I. Githure, International Centre of Insect Physiology and Ecology, Nairobi, Kenya.

MSc Thesis: The in-vitro and in-vivo effects of *Ricinus communis* leaf extracts and seed oil on *Leishmania major* promastigotes and infections in BALB/c mice. Advisor: Dr. Chris Anjili, Kenya Medical Research Institute; co- advisor: Prof Lucy Irungu, University of Nairobi, Kenya.

MAJOR PROFESSIONAL ACHIEVEMENTS

1. Won approximately \$850,000 over a 3 year period in funding for research on vector borne diseases from the Department of Defense, Global Emerging Infectious Disease Surveillance
2. Established a research laboratory with 7 lab members (1 lab technician and 5 PhD students and 1 MPH student) dedicated to studying mosquitoes and malaria at the University of Florida
3. Led the effort to establish a field based infectious disease research laboratory from ground up in rural Haiti for research on vector borne diseases
4. Mentored/Mentoring more than 15 students including 9 PhD's, 5 MPH, several undergraduate students. Continues mentoring and teaching at University level
5. Published 25 peer reviewed publications. Several manuscripts in preparation

PROFESSIONAL EXPERIENCE

1. **June 2009 -present:** Research Assistant Professor, Department of Environmental and Global Health, College of Public Health and Health Professions, University of Florida
2. **June 2008-May 2009:** Research Assistant Scientist, Department of Epidemiology and Biostatistics/ Emerging Pathogens Institute, College of Public Health & Health Professions, University of Florida
3. **June, 2007–June 2008:** Visiting Research Scientist (Membrane Physiology), Whitney Laboratory for Marine Biosciences, University of Florida, USA
4. **June, 2003–2005:** Senior Research Officer (Entomology), Centre for Biotechnology, Research & Development (CBRD), Kenya Medical Research Institute (KEMRI), Nairobi, Kenya.
5. **June, 2003–Mar, 2004:** Secretary, Centre Scientific Committee, Centre for Biotechnology Research and Development, Kenya Medical Research Institute (KEMRI).
6. **Dec, 2002–Dec, 2003:** JICA Entomology Counterpart; Eastern and Southern Africa Center for International Parasite Control, Kenya Medical Research Institute, Nairobi, Kenya
7. **Aug, 1998–Dec, 2002:** Assistant Research Officer /Research Officer, Centre for Biotechnology, Research and Development (CBRD), Kenya Medical Research Institute, Nairobi, Kenya.
8. **May, 1997–Dec, 1998:** Research Associate, Dept. of Ornithology, National Museums of Kenya, Nairobi, Kenya
9. **Aug, 1996–Dec, 1998:** Research Associate, Department of Zoology, University of Nairobi, Nairobi, Kenya

RESEARCH SUPPORT

1. **2010 – 2013: DoD-GEIS: Geospatial and Longitudinal Trends in Plasmodium falciparum Chloroquine Resistance in Haiti: (USD 843,000): PI - Okech BA:** The goal is to map the trends of *P. falciparum* malaria resistance in Haiti. Malaria resistance genotypes are identified by PCR followed by in-vitro culture techniques. Malaria patients receiving chemotherapy are followed up for 42 days to determine treatment outcomes (cure rates). In addition, all reported and confirmed malaria cases are mapped into a GIS ArchView database to provide data on geospatial trends of malaria infection in Haiti. Follow-up entomological investigations are conducted at villages where confirmed malaria cases cluster to determine mosquito vectors responsible for malaria transmission and their breeding sites.

2. **2010: DoD-GEIS: Establishing a Modest Infectious Disease Research Field Laboratory in Rural Haiti (\$110,000): Co-PI: Okech, BA; (supplement to PI: Dr. Gray, GC) (Completed):** The goal of this project was to set up a modest infectious diseases field laboratory in rural Haiti for the preparation of scientific specimens. This laboratory is used to support the collaboration of University of Florida, U.S. Department of Defense, and other collaborating investigators in studying and preventing infectious diseases in Haiti. The lab supports surveillance, research, and intervention work conducted in concert with US government priorities to support Haitians & the Haiti Ministry of Health.

3. **2005 – 2008: WHO/TDR- A41398. Role of salivary gland excretions in Anopheles midgut and on Plasmodium development, USD 20, 000, PI Okech, BA (Completed).** The above project sought to determine the role of mosquito saliva in the vector and in transmission of the malaria parasite. Results from the study may lead to a transmission-blocking tools for malaria control.

4. **1998 – 1999: DFID-UK Agricultural Research Fund: Helminthiasis in free ranging domestic chicken (*Gallus domesticus*) in Kenya, USD: 15,000, PI Okech, BA (Completed):** The goal of the project was to assess helminthic infections in chickens from local abattoirs and from individual farms in Kenya.

5. **1996 – 1997: International Fund for Avian Research (IFAR), UK. Avian hematozoa of wild birds in Kenya, USD \$500, PI Okech, BA.** The goal of this project was to identify hematozoa birds caught at the National Museums of Kenya grounds by the Nairobi Ringing Group.

SUBMITTED PROPOSALS

1. **2013: Entomological Capacity Strengthening for Ecological Surveillance of Mosquito Vectors of Malaria and other Arboviruses in Haiti (\$73) PI Okech, BA**
2. **2013: Efficacy of artemisinin combination therapy in the treatment of uncomplicated Plasmodium falciparum malaria in Haiti (\$83K) PI Okech, BA**

PROFESSIONAL TRAINING

1. **Mar, 2011:** Bio-safety Level 3 safety Training, by the Emory University Onsite BSL3 program
2. **Jul, 2012:** Shipping & Transport of Biological Materials (regulations of DOT, IATA, ICAO), University of Florida
3. **Nov, 2011 (every 2 yrs.):** Blood Borne Pathogens Training, University of Florida
4. **Nov, 2011 (every 2 yrs.):** Biomedical Waste Disposal Training, University of Florida
5. **Feb, 2013 (annual):** HIPAA and Privacy for Research Training, University of Florida
6. **Jun, 2011 (every 3 yrs.):** CITI online Training in human research subjects protection for Biomedical researchers offered by National Institutes of Health
7. **Mar, 2000:** Handling and Managing Biological Materials MR4-ATCC,-NIAID workshop, Ouagadougou, Burkina Faso

OTHER FELLOWSHIPS

1. **Mar, 2004 – Mar, 2005:** Japan International Co-operation Agency Individual Training Fellowship in Medical Entomology (Salary and Research costs).
2. **Aug, 1999 – Dec, 2002:** National Institute of Health ICIDR sponsored Doctoral Scholar Fellowship by the African Regional Postgraduate Program in Insect Science (ARPPIS), International Centre of Insect Physiology and Ecology, Nairobi, Kenya.

TEACHING AND MENTORING

1. **Spring, 2009 - present:** Instructor: PHC 6512 Environmental Management of Vector Borne Diseases (every Fall Semester), College of Public Health and Health Professions, University of Florida
2. **Spring, 2009 to present:** Guest Instructor: PHC 6301 Aquatic Systems and Environmental Health, MPH students, College of Public Health and Health Professions, University of Florida
3. **Fall, 2009 to present:** Guest Instructor: PHC 6517 Public Health Concept in Infectious Diseases, College of Public Health and Health Professions, University of Florida (every Fall Semester)
4. **Summer 2011 to present:** Contributing instructor: PHC 6515, An Introduction to Entomology, Zoonotic Diseases, and Food Safety, College of Public Health and Health Professions, University of Florida
5. **Aug, 2003 to Feb 2004:** Teaching Assistant: Medical Entomology, Institute of Tropical Medicine and Infectious Diseases, Jomo Kenyatta University of Agriculture and Technology, Nairobi. Developed and directed medical laboratory sessions (a 3 hour lab session per week for 12 weeks).
6. **Fall, 2004:** Mentored 2 Japanese undergraduate students on HPLC technique to analyze mosquito gut samples
7. At the University of Florida Whitney Laboratory, I supervised an undergraduate student on Laser Scanning Confocal Microscopy and went ahead to win the best summer research student award and an award at the 2006 Research Education for Undergraduates at Sigma Xi award.

UNIVERSITY COMMITTEE MEMBERSHIPS

1. **June 2009 to present:** Member, IRB-01 - UF Health Sciences Center Institutional Review Board
2. **June, 2009 – 2011:** Faculty Council, College of Public Health and Health Professions, UF
3. **June 2009 – June 2012:** Member Health Sciences Center Conduct Committee, UF
4. **September 2009-October 2012:** Member Advisory Council, Center for African Studies, UF

STUDENT SUPERVISION

Dr. Okech has Graduate Faculty status at the University of Florida and has supervised several students at the undergraduate and graduate levels (MS and PhD).

1. Michael VonFricken, PhD 2014 (candidate) Global Health - committee chair
2. Alex Weppleman, PhD 2014 (candidate) Global Health- committee chair
3. Maha El Badrey, PhD - 2014, Global Health- committee chair
4. Ali Messenger, PhD - 2013 (candidate) - Global Health, committee chair
5. Ephraim Ragasa, PhD -2013 (candidate), Medical entomology - committee member
6. Eva Buckner, PhD - 2013 (candidate) Medical entomology - committee member
7. Tamar Carter, PhD - Epidemiology - committee member
8. Dawit Woldu, PhD, Medical Anthropology, 2012, University of Florida – Co-Advisor
9. Robert Karanja, PhD, 2012, Medical entomology, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya
10. Josyline Cirindi, MSc Medical entomology, Kenyatta University, Kenya, 2006
11. Frances Tanner, MPH 2012 - Environmental Health
12. Alison Stargel, MPH, 2012 - Environmental Health
13. Michael Von Fricken, MPH - Public Health
14. Emily Fleisher, Bachelor of Health Sciences, Honors program, 2012
15. Dayana Bermudez, Bachelor of Health Sciences, Honors program, 2010
16. Bhumi Patel, Bachelor of Health Science Honors program, 2010

Several undergraduate students including many under the Research Experience for Undergraduates (REU program). One of the students won an award in the 2006 Sigma Xi student research conference competition in Detroit, Michigan for the best research.

PEER REVIEWED PUBLICATIONS

1. Weppelmann TA, Carter TE, Chen Z, von Fricken ME, Victor YS, Existe A, Okech, BA. High frequency of the erythroid silent Duffy antigen genotype and lack of *Plasmodium vivax* infections in Haiti. *Malar J.* 2013 Jan 24;12: 30. doi: 10.1186/1475-2875-12-30
2. Tamar Carter, Megan Warner Connie J. Mulligan, Alexander Existe, Yves SaintVictor, Gladys Memnon, Jacques Boney, Roland Oscar, Mark Fukuda, Bernard A. Okech (2012). Evaluation of Dihydrofolate Reductase and Dihydropteroate Synthetase Genotypes that Confer Resistance to Sulfadoxine-Pyrimethamine in *Plasmodium falciparum* in Haiti. *Malaria Journal*, 2012 Aug 13;11:275. doi: 10.1186/1475-2875-11-275

3. Sterling KM, Okech BA, Xiang MA, Linser PJ, Price DA, Vanekeris L, Becnel JJ, Harvey WR (2012). High affinity (3)H-phenylalanine uptake by brush border membrane vesicles from whole larvae of *Aedes aegypti* (AaBBMVw)., *J Insect Physiol.* 2012
4. Okech BA and Mwandawiro CS (2011) Malaria, bilharzia and geo-helminth transmission in Kenya: Environmental determinants.. In: Nriagu JO (ed.) *Encyclopedia of Environmental Health*, volume 3, pp. 568–576 Burlington: Elsevier.
5. Harvey WR, Okech BA, Linser PJ, Becnel JJ, Ahearn GA, Sterling KM (2010). H(+) V-ATPase-energized transporters in brush border membrane vesicles from whole larvae of *Aedes aegypti*. *J Insect Physiol.* 56(10):1377-89
6. Harvey, W.R. and Okech, B.A. (2010) Na⁺, K⁺, H⁺ and Amino acid, transport in larval mosquito alimentary canal. In *Epithelial Transport Physiology*, Editor G. Gerencser, Humana- Springer Verlag, pg113 – 148.
7. Harvey, W.R., Boudko, D.Y and Okech, B.A. (2009) NHEVNAT, H⁺ V-ATPases Electrically Coupled to Na⁺: Nutrient Amino acid Transporters (NATs) Constitute Functional Na⁺/H⁺ Exchangers (NHEs). *Journal of Experimental Biology*, 212 (3):347-57
8. Okech BA, Mwobobia IK, Kamau A, Mwatele C, Amano T, Mwandawiro CS (2008). Use of integrated malaria management reduces malaria in Kenya. *PLoS ONE*, 3(12):e4050
9. Smith, K. E., VanEkeris, L.A., Okech, B.A., Harvey, W.R. and Linser, P.A. 2008, Larval *Anopheles* mosquito recta exhibit a dramatic change in localization patterns of ion transport protein in response to shifting salinity: a comparison between *Anopheline* and *Culicine* larvae. *J Exp Biol.* 2008 Oct;211(Pt 19):3067-76
10. Okech, BA, Meleshkevitch, EA, Miller, MM, Popova, LB, Harvey, WR and Boudko, DY (2008). Synergy and Specificity of Two Na⁺: Amino Acid Symporters in the Alimentary Canal of Model organism, *Anopheles gambiae*. *Journal of Experimental Biology*, 211:1594-602.
11. Okech, BA, Boudko, DY, Harvey, WR (2008) Cationic pathway of pH regulation in *Anopheles gambiae* larva. *Journal of Experimental Biology*, 211, 957 – 968.
12. Rheault, MR, Okech, BA, Keen, SBW, Miller, MM, Meleshkevitch, MM, Linser, PJ, Boudko, DY and Harvey, WR (2007). Molecular Cloning, Phylogeny and Localization of a First Alkali Metal Ion/Hydrogen Ion Antiporter a Metazoan *Anopheles gambiae* (AgNHA1). *Journal of Experimental Biology*, 210, 3848 -3861.
13. Okech, B A, Gouagna LC, Beier JC, Yan G, Githure JI. (2007) Larval habitats of *Anopheles gambiae* s.s. (Diptera: Culicidae) influences vector competence to *Plasmodium falciparum* parasites. *Malaria Journal* 6: 50

14. Okech, B, Irungu, LW, Cooper, JE (2006). Helminthiasis of free ranging indigenous domestic poultry (*Gallus domesticus*) in Kenya. *Bull. Animal Health Prod Africa*, 54, 2, 92 – 99.
15. Okech, B, Arai, M, Matsuoka, H. (2006). The effects of blood feeding and exogenous supply of tryptophan on the quantities of xanthurenic acid in the salivary glands of *Anopheles stephensi* (Diptera: Culicidae). *Biochem Biophys Res Commun*, 24;341(4):1113-8
16. Okech BA, Irungu LW, Anjili CO, Munyua JK, Njagi ENM, Rukunga, G (2006). The in-vitro activity of total aqueous and ethanol leaf extracts of *Ricinus communis* on *Leishmania major* promastigotes. *Kenya Journal of Sciences Series B* vol 13, No 1, page 1 – 4.
17. Okech BA, Gouagna LC, Walczak E, Kabiru EW, Beier JC, Yan G, Githure JI. 2004. The development of *Plasmodium falciparum* malaria in experimentally infected *Anopheles gambiae* ss (Diptera: Culicidae) under ambient microhabitat temperature in western Kenya. *Acta Tropica*, 92 (2) 99 – 108.
18. Okech BA, Gouagna LC, Kabiru, EW, Beier JC, Yan G, Githure JI. 2004. Influence of age and previous diet of *Anopheles gambiae* (Diptera: Culicidae) on the infectivity of natural *Plasmodium falciparum* gametocytes from human volunteers. *J. Insect Sci.*, 4, 33.
19. Okech BA, Gouagna LC, Kabiru EW, Walczak E, Beier JC, Yan G, Githure JI. 2004. Resistance to high temperatures of the early midgut stages of natural isolates *Plasmodium falciparum* in artificially infected *Anopheles gambiae* (Diptera: Culicidae) mosquitoes. *J. Parasitol.*, 90 (4) 764 – 768.
20. Okech BA, Gouagna LC, Killeen GF, Knols BG, Kabiru EW, Beier JC, Yan G, Githure JI. 2003. The influence of sugar availability and indoor microclimate on the survival of *Anopheles gambiae* under semi field conditions in western Kenya. *J. Med. Entomol.*, 40, 657 – 663.
21. Okech BA, Gouagna LC, Knols BG, Kabiru EW, Killeen GF, Beier JC, Yan G, Githure JI.. 2004. The influence of indoor microclimates and diets on the survival of *Anopheles gambiae* (Diptera: Culicidae) in village house conditions in western Kenya. *Int. J. Trop. Insect Sc.*, 24 (3) 207 – 212.
22. Bousema JT, Gouagna LC, Drakeley CJ, Meutstege AM, Okech BA, Akim IN, Beier JC, Githure JI, Sauerwein RW. 2004. *Plasmodium falciparum* gametocyte carriage in asymptomatic children in western Kenya. *Malaria J.* 17, 3 (1):18.
23. Gouagna LC, Ferguson HM, Okech BA, Killeen GF, Kabiru EW, Beier JC, Githure JI, Yan G. 2004. *Plasmodium falciparum* malaria disease manifestations in humans and transmission to *Anopheles gambiae*: a field study in western Kenya. *Parasitology*. 128 (3), 235-243.
24. Gouagna LC, Okech BA, Kabiru EW, Killeen GF, Obare P, Ombonya S, Beier JC, Knols BG, Githure JI, Yan G. 2003. Infectivity of *Plasmodium falciparum* gametocytes in patients attending a rural health centre in western Kenya. *East Afr. Med J.*80 (12) 627-634.
25. Bousema JT, Gouagna LC, Meutstege AM, Okech BA, Akim NI, Githure JI, Beier JC, Sauerwein RW. 2004. Treatment failure of pyrimethamine-sulphadoxine and induction of *Plasmodium falciparum* gametocytaemia in children in western Kenya. *Trop Med Int Health.*8 (5) 427-430.

MANUSCRIPTS IN PREPARATION

1. Evaluation of Plasmodium falciparum multi-drug resistance -1 and chloroquine resistance transporter genotypes in Haiti
2. Therapeutic efficacy of chloroquine in the treatment of uncomplicated Plasmodium falciparum malaria after many decades of its use in Haiti
3. Prevalence of P. falciparum in symptomatic malaria patients treated with chloroquine in Haiti
4. Detection of sickle hemoglobin in febrile patients in Leogane, Haiti by a turbidity based method coupled with spectrophotometry
5. Determination of glucose-6-phosphate dehydrogenase (G6PD) deficiency by a rapid diagnostic test method in febrile patients in Haiti
6. A review of malaria treatment strategies and policies in Haiti from 1950 to the present
7. Environmental factors Influencing Dengue Mosquito Vector Productivity in Haiti
8. Susceptibility of field collected Culex quinquefasciatus mosquitoes to Deltamethrin, Permethrin and Malathion in Haiti

REFERENCES

References available upon request