

Statement of Purpose

Worldwide, the propensity of mosquito vectors to transmit diseases such as dengue fever, filariasis and malaria, continue to represent a serious threat to socio-economic development. The impact of the disease burden is even more pronounced in the tropical regions. Currently, the absence of a protective vaccine, the spread of parasite resistance to therapeutic drugs and mosquito resistance to insecticides are the main obstacles to disease control and elimination. Till date, the use of chemical insecticides makes up most vector control programmes. While being effective, the dramatic increase in mosquito resistance to these chemicals shows that continual usage cannot be further relied upon.

From the fore goings, resistance management strategies are very critical, if the efficacy of current practices is to be preserved. This will require a deep understanding of adaptive mechanisms such as behavioural and metabolic resistance. Thus, as a prospective graduate student at the University of Cincinnati, it is my interest to study the mechanisms of insecticide resistance in mosquito; and consequently identify the molecular basis (genetic markers) for such mechanisms. Already, I have gained valuable experience in insect studies. My undergraduate research work focused on the “Larvicidal properties of *Datura stramonium* and *Nicotiana tabacum* against Mosquito (Culicine species)”.

The result of my findings demonstrated that integrated pest management approach cannot be undermined; an efficient vector control programme cannot solely rely on biological control alone. Thus, other methods of control including chemical control are essential. Hence, it is my interest to commit my doctoral research to explore the sustainable complementary approach to the management of the problem of insecticide resistance in mosquitoes.

My choice of a Ph.D. program at the University of Cincinnati was inspired by the fact that the institution offers students a balance of educational excellence and real-world experience; and also the opportunity to learn from faculty members who are ranked as top in their respective fields among American Universities. Further to this; I am fascinated by the University of Cincinnati’s tag as a “research heavyweight” and the long rich history of the institution as a research pioneer. In addition, I am fascinated by the commitment of the institution to advance multi- and trans-disciplinary initiatives in existing and emerging communities of research excellence. Also, the grading of the institution as a Tier One university (U.S. News & World Report) and its ranking in the top 200 of Universities worldwide was instrumental to my choice.

From my research on the Faculty staff in the Department of Biological Sciences at the University of Cincinnati, I found out that Professor Joshua Benoit’s research interest is in Insect Physiology and Vector Biology and he has worked on the mechanisms underlying insect stress tolerance in medically important insects such as mosquitoes and ticks. Leveraging on these, my aim during the program is to seek knowledge and experience in a variety of techniques, get more proficient in bioinformatics and field research. I also intend to explore the use of cross-disciplinary approach in solving vector problems, while fully exploiting national and international collaborations. More importantly, the privilege to get properly nurtured by seasoned researchers holds promises that may lead to valuable collaborations for cutting-edge research and knowledge transfer. Above all, I desire to learn new cultures while projecting the culture of my country on a

global stage. This I believe will provide interactive forums that challenge people to work together to tackle pertinent vector issues. My home country is at a point where young academics, like me, are needed to serve dual roles; teachers and role models to younger generations. In essence, the Ph.D. program in Biological Sciences at your prestigious institution will be central in achieving this goal, as knowledge and skill gained will be useful in areas of Integrated Pest management, vector and disease management, genomics and Insect Physiology.

My long term career goal is not just to become an academic, but to serve as a seasoned consultant to research institutes in my home country in order to collaborate on the development of innovative insecticide resistance management strategies not just for insects of public health concern but also for those of agricultural importance. Thus, the doctoral program will help advance my long-term career plan; improving the quality of livelihood.