

**GEORGE MASON UNIVERSITY
COLLEGE OF SCIENCE
BIOLOGY DEPARTMENT SEMINAR
Fall 2014**

**Raymond J St. Leger, Distinguished University Professor, Department of Entomology,
University of Maryland, College Park, USA**

“Using GM pathogens to Control Mosquito-Borne Diseases”

Conservative estimates put the number of new malaria infections each year at 500 million, and every one of those infections started with a mosquito bite. Although millions die from arthropod borne diseases the ongoing development of pesticide resistance has reduced our control options. I will describe how we used entomopathogenic fungi as a vehicle to carry genes encoding arthropod toxins and antibodies into insects, thereby greatly increasing their ability to kill mosquitoes. We have also used fungi as a delivery system for human antibodies so that they clear mosquitoes of >98% of malaria even if their malaria infections are very advanced. We have moved the work outdoors, carrying out the first-ever field trials of genetically-engineered fungi in the USA and West Africa, and worrying about long-term issues such as the evolvability of transgenic microbes, and eventual evolution of resistance by the insects. We have also conducted transcriptomic studies in order to understand how mosquitoes, malaria and pathogens interact at the molecular level. This unraveled distinct and overlapping fungicidal and plasmocidal mechanisms, and revealed novel insight into the ability of malaria and fungal parasites to suppress or stimulate host immunity and each other.

I will also briefly describe how we are using *Drosophila* in a genome wide screen of host factors that influence the progression of human pathogenic fungi. Largely due to growing numbers of immune-compromised individuals, fungal infections in humans are becoming an increasing concern. *Drosophila* has a high degree of molecular, cellular and physiological conservation with humans which has allowed the modelling of *Candida* infections.

TUESDAY September 23, 2014

3:00-4:15 PM

Johnson Center Room 334 Meeting Room E

Sponsored by the Biology Department