Department of Biomedical Informatics

Arizona State University

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Biomedical Informatics Weekly Seminar Series

Population dynamics & host-vector ecologies of tropical vector-borne infectious diseases: addressing challenges using mathematical models

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January 27, 2017 (2:45 p.m. – 4:00 p.m)
Room Sj 1-149 , Samuel C. Johnson Research Bldg.
Mayo Clinic Scottsdale

Speaker's Bio: **Anuj Mubayi** is trained in mathematical, computational and statistical modeling methods. He uses techniques from Nonlinear Dynamics, Stochastic Processes, Uncertainty and Sensitivity Analysis and Statistics to develop models for understanding mechanisms in the field of Epidemiology, Public Health and Social Sciences. He received his PhD from ASU in 2008.

Talk Abstract: Mathematical models of disease transmission that account for the need to optimize/maximize the use of limited resources are particularly lacking in the context of neglected tropical diseases such as Visceral Leishmaniasis (VL), West Nile Virus and Chagas, that is, vector-borne diseases that affect the health of hundreds of millions of individuals every year. Recent advances in data science or "Big Data," have yet to play a critical role in such a program due to the unfortunate dominance of sparse data sets; a limitation enhanced by high levels of inaccuracy and underreporting as well as the recurrence of plain errors in recording the prevalence, incidence and treatment of neglected vector-borne diseases in many regions of the world.

The dynamics of t.cruzi, the parasite responsible for Chagas disease, is presented to illustrate some of the ecological dynamics being observed across national borders. I will present a modeling study that assesses the dynamics of human-pathogenic t.cruzi as it moves across the US-Mexico border through the interactions and movement of populations of mammals. I evaluate the likelihood that the Mexican variant may displace the mild American variant, creating, in the process, a reservoir of pathogenic t.cruzi that may eventually impacts rural human populations and consequently, blood banks in the USA.