THE UNIVERSITY OF TENNESSEE CHATTANOOGA

DEPARTMENT OF MATHEMATICS AND SIMCENTER

present

"Spatial Spread of Epidemic Diseases in Geographical Settings: Seasonal Influenza Epidemics in Puerto Rico"

by

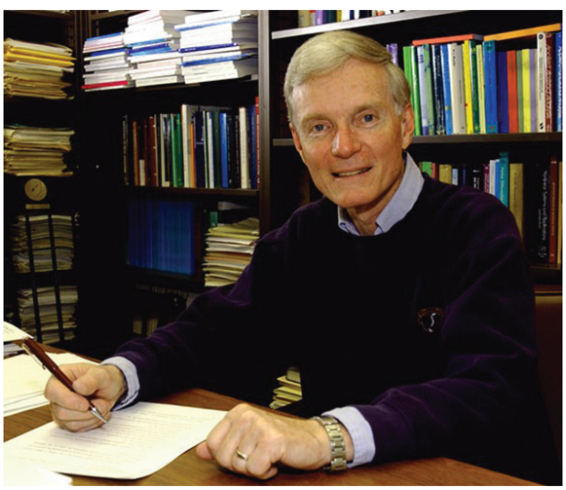
Dr. Glenn Webb

Professor of Mathematics, Vanderbilt University

September 21st, 2:30-3:30 p.m., EMCS Rm. 422*

Networking | Light Refreshments | Seminar | Q & A

Public Invited



A deterministic model is developed for the spatial spread of an epidemic disease in a geographical setting. The model is focused on outbreaks that arise from a small number of infected individuals in subregions of the geographical setting. The goal is to understand how spatial heterogeneity influences the transmission dynamics of susceptible and infected populations. The model consists of a system of partial differential equations with a diffusion term describing the spatial spread of an underlying microbial infectious agent. The model is applied to simulate the spatial spread of the 2016-2017 seasonal influenza epidemic in Puerto Rico. In this simulation, the reported case data from the Puerto Rican Department of Health are used to implement a numerical finite element scheme for the model. The model simulation explains the geographical evolution of this epidemic in Puerto Rico, consistent with the reported case data.

Glenn F. Webb is a mathematician at Vanderbilt University. He received his Ph.D. from Emory University in 1968. He has published over 170 articles in research journals. In 1985, he published a research monograph *Theory of Nonlinear Age-Dependent Population Dynamics*. He has supervised 19 Ph.D. students at Vanderbilt University. He became a fellow of the American Mathematical Society in 2012.

His research interests include: (1) mathematical models of tumor cell populations and the role of stem cells in tumor cell proliferation; (2) mathematical models of antibiotic resistance and the development of antibiotic resistance in hospital patient populations;(3) mathematical models of multi-group dynamics in epidemics; (4) mathematical models of the 2014 Ebola epidemic in West Africa and the impact of contact tracing; (6) mathematical models of tumor growth and the interpretation of lung CT scans; (7) mathematical models of the Zika epidemic in Rio de Janeiro, Brazil; and (8) mathematical models of epidemics in spatial regions.

** UTC Engineering, Math, Computer Science Building, Room 422, 735 Vine St., Chattanooga TN, 37403*