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**Eric Forgoston\*** ([eric.forgoston@montclair.edu](mailto:eric.forgoston@montclair.edu)), Dept. of Applied Mathematics and Statistics, Montclair State University, 1 Normal Avenue, Montclair, NJ 07043. *Invasion and Extinction in Stochastic Epidemic Models.*

Noise plays a fundamental role in a wide variety of physical and biological dynamical systems. The noise may be internal or external - internal noise is inherent to the system itself and arises due to the random interactions of a finite number of agents in the system, while external noise arises from a source outside of the system. In recent years, it has been shown that even weak noise can induce a large fluctuation that leads to population extinction, switching between metastable states in ecological systems, or the escape of a particle from a potential well. After providing an overview of the relevant stochastic theory, we will show the development and application of new techniques to better understand the outbreak vulnerability and extinction dynamics for stochastic disease models. (Received January 17, 2020)