1107-92-220 **Khem Raj Ghusinga*** (khem@udel.edu), 143 Evans Hall, Dept of Elec and Comp Engg, University of Delaware, Newark, DE 19716, and **Abhyudai Singh** (absingh@udel.edu), 143 Evans Hall, Dept of Elec and Comp Engg, University of Delaware, Newark, DE 19716. *Modeling bacteriophage λ lysis time at a single-cell level.*

Lysis of a host *E. coli* cell after being infected from a bacteriophage λ is a precisely timed event. The timing of lysis has profound effects on the fitness of phage progeny and is determined by the phage-encoded protein, holin, which accumulates in the membrane. When a critical holin level is attained, hole formation takes place resulting in immediate lysis of the host cell. Here, we discuss the cell-to-cell variation in lysis time arising due to the inherent stochasticity in gene expression. Lysis time is modeled as the first-passage time for holin levels to cross a critical threshold. Analytical expressions for the first-passage time moments are derived. Model predictions on how different model parameters modulate lysis time moments are verified with experimental data. Lastly, our analysis reveals regulatory motifs that enhance the robustness of lysis timing to cellular noise. (Received January 15, 2015)