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Adina Oprisan* (aoprisan@barry.edu), Depart. of Mathematics and Computer Sciences, Barry University, Miami Shores, FL 33161. *On an almost sure functional central limit theorem for Semi-Markov processes.*

In this talk I discuss the long-run behavior of complex discrete-event stochastic systems. The underlying stochastic process of a discrete-event system is a semi-Markov process that evolves over continuous time according to a discrete-time Markov chain. In applications a reward structure is often associated with the underlying process. A general model for the reward earned over the interval $[0, t]$ is

$$R(t) = \sum_{n=1}^{N(t)} r(S_{n-1}, S_n) + \int_0^t f(X(u)) du$$

where $r(s, s')$ is the lump-sum reward whenever the system makes a transition from the state s to the state s' and $f(s)$ is a continuous reward rate. I show that the functional central limit theorem of the reward process (P. Glynn and P. Haas, 2004) admits an almost sure version based on empirical measures with logarithmic average associated with the corresponding scaled process and further prove a Donsker-Varadhan type of large deviation result. (Received September 17, 2013)