Rare Event Extinction on Stochastic Networks\textsuperscript{1} IRA SCHWARTZ\textsuperscript{2}, Naval Research Lab, LEAH SHAW, College of William and Mary, BRANDON LINDLEY, R. D. Wagner Associates, Inc. — We consider the problem of extinction processes on random networks with a given structure. For sufficiently large well-mixed populations, the process of extinction of one or more state variable components occurs in the tail of the quasi-stationary probability distribution, thereby making it a rare event. Here we show how to extend the theory of large deviations to random networks to predict extinction times. In particular, we use the theory to find the most probable path leading to extinction. We apply the methodology to epidemic models and discover how mean extinction times scale with epidemiological and network parameters in Erdos-Renyi networks. The results are shown to compare quite well with Monte Carlo simulations of the network in predicting both the most probable paths to extinction and mean extinction times.

\textsuperscript{1}BL was a National Research Council post doctoral fellow. IBS was supported by NRL base funding and ONR. LBS was supported by the ARO, AFOSR, and NIH. 
\textsuperscript{2}Nonlinear Systems Dynamics Section

Ira Schwartz
Naval Research Lab