Microbial organisms encounter a variety of environmental conditions that influence their cellular regulation and secretion patterns. *Klebsiella pneumoniae* is an opportunistic bacterial pathogen that typically infects individuals with weakened immune systems. It is ubiquitously found in the environment, but is more commonly found in the hospital environment where it is responsible for causing nosocomial infections. Using *K. pneumoniae* as a model system, I will determine how a changing environment influences the bacterial proteome and how protein-protein interactions impact its ability to adapt and survive. I hypothesize that *K. pneumoniae* will alter its cellular proteome and secretome to adapt to changing environmental conditions and in response to host defense mechanisms. My proposed research project aims to build upon the current knowledge of *K. pneumoniae* through experiments targeted to 1) understand the role of metal ions (e.g. zinc) in *K. pneumoniae* on growth, morphology, and physiology, 2) identify bacterial and host proteins that play a role during infection and survival; and 3) develop a novel method to identify host-pathogen protein-protein interactions. The long-term goal of my research program is to fundamentally understand microbial physiological parameters and differences in adaption and survival strategies in a changing environment. Moreover, this data should provide a better understanding of the infection process and how *K. pneumoniae* responds under infection conditions. With the data generated, I aim to uncover new targets for drug development and therapeutic intervention.