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Mixed fungal-bacterial biofilms are a major source of infections on medical implants and in mucosa, such as the mouth. The common fungal pathogen being *Candida albicans*. There is strong evidence that different bacteria like *Lactobacillus* and *Streptococcus* can either inhibit or promote growth and virulence of *C. albicans* biofilms. To fully understand the interactions between these different species, an agent based model (ABM) is constructed using data from experiments. In the ABM, the different bacteria and fungi are the agents with characteristics of growth, decay, death and mechanical interactions. The ABM simulations are validated using images of the biofilm. To reduce the virulence of *C.albicans*, the biofilm composition has to be optimized. This involves minimizing the species diversity and minimizing the biofilm thickness. This multi-objective optimization of the ABM will be addressed in two steps-dimension reduction and then optimization using genetic algorithms. This involves searching for the Pareto frontier (set of solutions where there is a cost associated with improving a solution) for the original and reduced model and then comparing the two. (Received September 05, 2019)