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**Monte-Carlo Simulations of Drug Delivery on Biofilms**[1] ALPER BULDUM, ANDREW SIMPSON, Department of Physics, The University of Akron, Akron, OH — The focus of this work is on biofilms that grow in the lungs of cystic fibrosis (CF) patients. A discrete model which describes the nutrient and biomass as discrete particles is created. Diffusion of the nutrient, consumption of the nutrient by microbial particles, and growth and decay of microbial particles are simulated using stochastic processes. Our model extends the complexity of the biofilm system by including the conversion and reversion of living bacteria into a hibernated state, known as persister bacteria. Another new contribution is the inclusion of antimicrobial in two forms: an aqueous solution and encapsulated in biodegradable nanoparticles. The bacteria population growth and spatial variation of drugs and their effectiveness are investigated in this work.

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