1135-92-1913 **Shelby Stanhope*** (stanhope@temple.edu), Department of Mathematics, Temple University, 1805 N. Broad St, Wachman Hall, Philadelphia, PA 19122, and **Isaac Klapper** (klapper@temple.edu). *Mathematical Models of the Immune System's Response to Bacterial Infection on the Surface of an Implant Device.* Preliminary report.

The occurrence of biofilms on the surface of implant devices is a problem of great concern in the medical community. Persistent infection may ultimately require replacement of the device, thus increasing medical expenses and causing pain and suffering for the patient. In this study, we use mathematical modeling, in conjunction with data collected from laboratory studies, to model the immune response to bacterial infection on the surface of implant devices. Focusing on the initiation of infection, we aim to understand which factors determine the elimination of infection and which eventually lead to the development of a biofilm on the device. One of the first responders in the body's innate immune response are neutrophils, which follow chemical signals to locate and phagocytose bacteria. Using a system of partial differential equations, we model the growth of bacterial populations, their release of chemoattractants (which initiate the immune response), and the chemotactic movement of neutrophils to the sites of infection. By varying the amount of bacteria present in the initial infection and the strength of the body's immune response, we observe cases where the infection is completely eradicated and others where the infection persists. (Received September 25, 2017)