<u>USP Abstract Draft</u>

Biofilms are colonies of bacteria adhered to a surface where they form a structure and propagate by dispersing plankton into the surrounding medium. These structures are important to the study of bacteria because they develop a protective later that provides resistance against antibacterial and other attacks. Biofilm research is applicable in medicine, wastewater management, and material corrosion. The aim of this project is to produce a program that can model the growth of multiple biofilms in the presence of multiple substrates for instructional and research purposes in the Center for Biofilm Engineering. The program uses numerical methods including the Runge Kutta and Finite Difference schemes to solve growth equations for specified initial conditions and biofilm species. The results from this model have been compared to test cases with known analytical solutions. The model has been shown to accurately predict biofilm growth in simplified cases where a solution is known. The program developed in this project is easier to use and more versatile than previous tools. This program can be used as an agile tool in the research and instructional setting to get preliminary results without the time-consuming process of cultivating biofilm colonies for each initial test.