Automated Microorganism Detector[1] PELHAM KEAHEY, WILL HARDY, MASON CRADIT, STEVEN SOLIS, ANDREA HOLLAND, GERRY WADE, Southwestern University — The detection and identification of bacteria in blood samples is crucial for treating patients suspected of having a blood infection. Current hospital methods for pathogen detection are time-consuming processes with multiple steps. This project's goal was to develop an efficient biomedical device to detect bacterial growth in blood samples, based on Gerald J. Wade's 1979 invention (US patents 4250266 and 4267276). Detection was accomplished using a system of electronics to examine the change in the electrochemical properties of a sample in response to bacterial growth, by measuring the sample's electrical charging and charge dispersion characteristics. After initial trials, it was found that a sample yielded consistent voltage measurements of approximately 200 millivolts prior to any detectable microbial growth. The first species tested, *Escherichia coli* (*E. coli*), was detected 11.7 hours after its inoculation in a culture bottle at a concentration of approximately 5-10 organisms per milliliter. In future tests, it is expected that detection times will vary in proportion to the growth rate of each species.

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