



Fachbereich Elektrotechnik und Technische Informatik
Department of Electrical Engineering and Computer Science

Project Work, Bachelor
Christian Pieper

Evaluation of Biological MEMS for Bacteria Detection

Abstract

The presence of bacteria in water reservoirs and other storage areas must be detected quickly and reliably. If left unchecked or discovered too late, contaminated water can lead to widespread epidemics. As these water storage places are often remote, presently samples of water drawn from them must be transported to labs where they can be analyzed. The resulting delay can lead to the threats being identified late. The containment and/or eradication of the threat will be jeopardized as a result. The proposed Bacteria Detector will enable quick detection of bacteria on site. Basically it consists of a Biological Micro Electro-Mechanical System (MEMS) and a signal processing unit. MEMS development and production were a main part of this project. The MEMS contains a micro channel that the bacteria contaminated water can be pumped through. Quantum dots attached to those bacteria emit UV-light under excitation. This light was detected successfully, so a way was found to proof presence of bacteria. The developed signal processing unit also allows counting and displaying their amount. Eventually the developed parts are for experiments and serve as model for a small portable device.

Examiner: Prof. Dr.-Ing. Uwe Meier