

# Bioanalytical Sensing of Water Contamination

Subject: ICT

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Clean drinkable water is not guaranteed for everyone. Not only in poor countries but also in Switzerland, the waters are polluted with dangerous toxins. This project meets the need of a user-friendly and cost-effective measurement device based on innovative LASER technology to measure the water pollution. In this Bachelor thesis was developed an app, which enables mobilized analyzation of the measurement data.

## Situation

Water is one of the most important resources for humans, but not everyone has access to clean drinkable water. Often the water is polluted by pesticides, which are used in agriculture. A lot of these pesticides were declared as highly toxic and as a hazard to people. Although the use of some of those pesticides was prohibited long ago, the rain does still rinse out remains of those toxics into the waters. Therefore a low cost bioanalytical device is needed to measure the concentration of such a pesticide in water samples. This device is currently being developed in collaboration with Arrayon Biotechnology, the Swiss Center for Electronics and Microtechnology (CSEM) and the BFH.

## Assignment

To make laboratory setups more state of the art, in terms of controlling and displaying measurement data, as well as to modernize the handling of computer based measuring, the software LabVIEW should be controlled wirelessly by a tablet computer. The assignment of this thesis was to develop a mobile application, running on a tablet, which is optimized to simplify the laboratory work process, for marketing use and user friendliness.

## Implementation

This app was designed and implemented for an Android OS based tablet. The communication between the tablet and LabVIEW is ensured by a Bluetooth connection. LabVIEW collects all the interesting data and provides it to the app on the tablet. The app was implemented in Java and can control LabVIEW via a self implemented API and indicate the measured data. Apart from the visualisation of the data, even acoustic notifications inform the user about the measurement progress.

## Conclusion

In biotechnology, a huge amount of time is spent in the laboratory to e.g. prepare water samples. The increased mobility optimizes the work process of an operator. For example, he or she is observably less bound to the laboratory device. And the easy to use and intuitive graphical user interface increases the work flow as well. Therefore, the objective of this project was reached. This entire thesis was a very interesting interaction of bioanalytics and communication technology.



Lukas Baumann



Illustration of app and concept of this thesis