

**ERASMUS+ PLACEMENT  
Master-Project Internship– 2020/2021**

## Development of a Biosensor for Selective Detection of Low Microorganism Concentration in Drinking Water

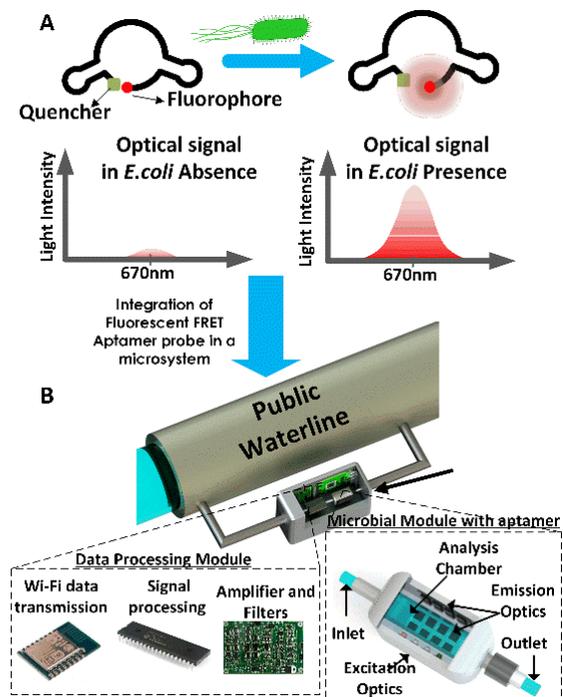
**Background & Motivation:** Currently, the guidelines to assess microbial water safety (from WHO) is based on a concentration threshold for indicator microorganism such as *Escherichia coli* (*E.coli*). This approach consists of periodic manual sampling, followed by laboratory culture and counting based on HPC (Heterophobic Plate Count) or a similar method. Despite this effort to create a worldwide standard, the current approach does not offer operational protection in real-time, given the delay in results ranging from 24h to 120h. Besides, other factors such as a wide number of infectious microorganism strains, low concentrations, occasional occurrence and non-culturable strains, create even more uncertainty that HPC can accurately evaluate the risk of microbial contamination. As an example, in Norway, two big outbreaks of gastrointestinal infections caused by drinking water were registered since 2000, the *Giardia* outbreak in Bergen in 2004 that caused 6000 infections, and the *Campylobacter* outbreak in Røros in 2007 that caused 1500 illness cases. Additionally, another 28 outbreaks events have occurred between 2003-2012 with a registered total of 8060 infections. This project consists of developing a compact infield system that can quantify in near real-time low levels of specific microorganisms in water distribution systems. From this point, we plan to develop a state-of-the-art Aptamer bioassay (optical-based), followed by its integration and automatization into a cost-effective microsystem.

**Proposed tasks for Placement project:** As an intern with undergoing a master's study in Microelectronics, Biomedical Engineering, or Micro/nanotechnologies fits well with this Erasmus Placement Internship project. Taking into account the workload expected from the number of ECTS credits to complete, the intern will participate in one of the following proposed activities:

- Development and Characterization of a Molecular Aptamer Bioassay for rapid *E.coli* detection;
- Design and fabrication of an optofluidic sensor with integrated optics for real-time analysis of the Aptamer Bioassay.

The intern will work in a team of multi-cultural backgrounds, including other junior researchers and senior researchers. The intern is responsible for the progress with tasks discussed and assigned within the project team.

**Work environment & cooperation:** The ERASMUS Placement internship is supported by the cooperation of biotech companies, SensoVann AS and Aqua Alarm AS (both located in Horten, Norway and being partners in the same project team). The project itself has cooperation with municipalities and water distributors.



Internship receives academic supervision from the University of South-Eastern Norway (USN) so as to ensure the education and academic value of the internship. The candidate conducts full-time equivalent work, and weekly meetings are typically arranged for progress checking and discussions.

**Important remarks:**

A final report is required as the delivery material for finalizing the internship. There's the possibility of preparing an academic journal paper together with the team, depending on the success of the results achieved. The period of internship is 6 months preferably, with the possibility of extension upon to agreement between both sides. The starting date is from September 1<sup>st</sup>, upon discussion with the candidate.

The host institution, to which Erasmus Placement agreement is made (either Sensovann or Aqua Alarm), is responsible to cover support to living costs with a minimum value of 2500 NOK monthly until the termination of the internship. This is in addition to the regular Erasmus Placement scholarship.

**Application material:**

- **Copy of course transcripts**
- **Curriculum vitae**
- **Motivation letter**

E-mail for receiving applications:

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