Formation of *N*-Nitrosamines in water and wastewater treatment is of concern due to their high carcinogenic potency, e.g., *N*-nitrosodimethylamine (NDMA) is estimated to be several hundred times more potent than the regulated trihalomethanes in drinking water. Rather than a direct release from specific sources, *N*-nitrosamines are known to be mainly formed *in situ* during disinfection processes such as chlorination, ozonation, etc. In principle, nitrosation can take place with any nitrogen-containing organic precursor present in water with a potential formation of a variety of *N*-nitrosamines. However, robust analytical tools available to date are somewhat limited to the commonly known individual *N*-nitrosamines, e.g., NDMA.

In 2017, our group, LTQE, developed an analytical platform which, based on UV photolysis and chemiluminescence, determines the total content of *N*-nitrosamines in water samples. This system had many shortcomings and therefore, the TONO analyzer is currently upgraded, aiming for a complete automation of the analytical procedure from sampling to detection including data analysis without human intervention. All the hardware modules such as autosampling platform, syringe pumps, valves, photoreactor, etc. were 3D-designed, 3D-printed and assembled in-house. Open-source microcontrollers (i.e., Arduino) were used to control individual hardware modules with Marlin as a firmware written in C++ and the user interface written in Python for serial communication with microcontrollers.

Currently, the development of the TONO analyzer has been nearly completed. The aim of this semester project is the optimization of operational conditions for the best analytical performance and testing of the application to real water samples. Individual tasks consist of preparation of chemical solutions in different conditions, the operation of the TONO analyzer with Python scripting, sampling campaigns for wastewater samples, preconcentration of collected samples, analyses of samples, and data analysis. The postdoctoral researcher responsible for this project will supervise the student with all the research activities mentioned above.