

Student Project: (B.Sc. or Master Thesis/ Semester project/ Internship)

Chemical Engineering, Chemistry, Environmental Engineering

Title: Development and validation of target and non-target analysis via high-resolution mass spectrometry for wastewater treatment

Topics: mass spectrometry, analytical instrumentation, water treatment, AOPs

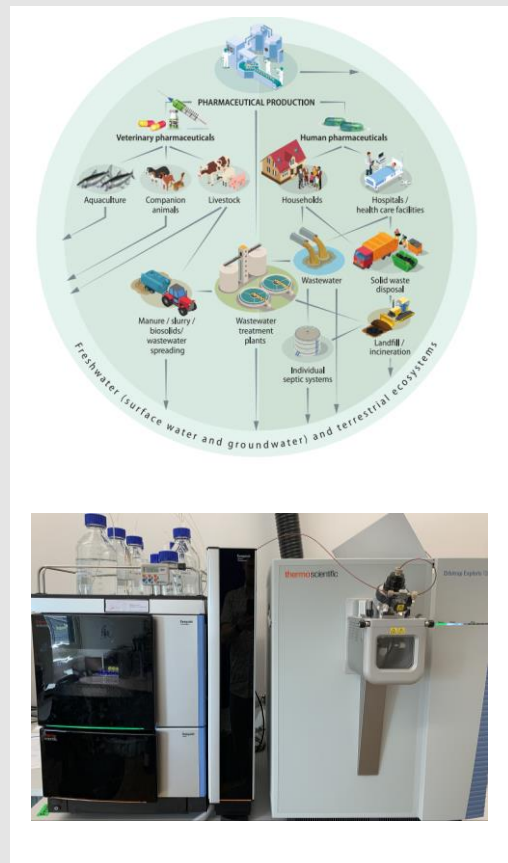
Type of work: Experimental (100%)

When: Autumn semester 2022, or as soon as possible

Exciting opportunity to work with the cutting-edge analytical instrument, and contribute to solving the global water pollution crisis together with ETH Zurich Startup, *Oxyle AG*

Project Overview:

- 🔗 Traces of **pharmaceuticals, antibiotics, hormones, pesticides, PFAS, industrial chemicals etc.** are detected in wastewater, groundwater and even drinking water.
- 🔗 Removal of these persistent highly active hazardous substances from (waste)water is a **global challenge**
- 🔗 **Advanced Oxidation Processes** produce reactive oxygen species (of radical nature) destroying contaminants
- 🔗 The **progress** in developing and (integrating) novel wastewater treatment methods is closely related to the **sensitivity and versatility of analytical instrumentation**



The following tasks are to be performed:

- 🔗 Literature review on the current status of **high-resolution mass spectrometry** for wastewater analysis.
- 🔗 Develop and validate the methods for target analysis of residues of **pesticides, pharmaceuticals, per- and polyfluoroalkyl substances** in spiked water
- 🔗 Perform target and **non-target screening** of industrial wastewater and groundwater before/after treatment
- 🔗 Identify the main **intermediates** and establish the **degradation pathway of selected pollutants**.
- 🔗 Process and report the data on the internal meetings



Required Skills

You are a highly motivated, diligent and goal-oriented student with:

- 🔗 Interest in development and validation of analytical methods
- 🔗 Hands-on experience with mass spectrometry and liquid chromatography
- 🔗 Analytical mindset combined with clean and accurate way of working
- 🔗 Fundamentals of organic chemistry
- 🔗 Prior working experience with high-resolution mass spectrometry (of advantage).
- 🔗 Knowledge of statistical methods of data analysis (of advantage)

Contact: Dr. Fajer Mushtaq (fmushtaq@ethz.ch), M.Sc. Roman Lyubimenko (roman.lyubimenko@oxyle.ch)

