INTERNSHIP OFFER

Ref. No. CH-2024-000092

Internship Host Information

Internship Host:	Eawag	Website: https://www.eawag.ch/en/	
	Process Engineering		
	Ueberlandstrasse 133	Location of placement: Dübendorf	
		Nearest airport: Zurich	
	8600 Dübendorf	Working hours per week: 42.0	
	Switzerland	Working hours per day: 8.4	

Number of employees: 520
Business or products: Swiss federal water research institute

Student Required

General Discipline:	NATURAL RESOURCES AND CONSERVATION; MECHANICAL ENGINEERING;CHEMISTRY AND CHEMICAL ENGINEERING	*Completed years of study:*	3
Field of Study:		*Student status requirements:*	Must be enrolled during entire internship
		Language required:	English Good (B1, B2)
Required Qualifications and Skills:		*Other requirements:*	
Programming		Fluent in English, written and spoken (min B2); Interview required	

Students with a finished Bachelor degree and basic knowledge in process engineering, chemical engineering, biological wastewater treatment, environmental science/engineering, civil engineering or in related fields is required
Excellent programming skills and understanding of processes required
Nice to have: experience with machine learning

Internship Offered

Research scope:
Recent research reveals that the potent greenhouse gas (GHG) and ozone depleting substance nitrous oxide (N2O) dominates GHG emissions from biological wastewater treatment. The development of effective operational strategies to reduce or avoid N2O generation requires in-depth understanding of the N2O formation mechanisms.
This internship involves advanced data analysis using machine-learning (ML) techniques on long-term datasets from full-scale biological wastewater treatment plants, with the goal of unravelling hidden relationships between operating conditions and N2O emissions.

Work plan:
Starting material: Clear overview of the existing data and its preprocessing a specific WWTP

Following tasks will be carried out during the internship (20 weeks – longer or shorter period is possible (min. 16 weeks)):
1. Getting familiar with the available data (2 weeks)
2. Screening analysis of ML models (4 weeks)
TASKS: (1) Creation of benchmark model (able to predict average N2O emissions), (2) generation of different ML models, (3) benchmarking based on predictive accuracy, (4) keep two most promising models.
OUTPUT: Insights whether the dataset provides enough information for the estimation of N2O formation.
3. Optimization and training two best ML models (4 weeks)
TASKS: Optimization and training of the two most promising ML model.
OUTPUT: Two ML models which quantitatively represent the N2O emissions.
4. First insights in explainable machine learning (8 weeks)
TASKS: (1) Review of XAI tools and possibilities (2) Employ XAI tools: understand predictions of the ML models and if possible translate into mechanistic building blocks
OUTPUT: First insights in using ML to support mechanistic N2O model building.
5. Reporting and buffer (2 weeks)

You will be supervised on a daily basis by a postdoctoral student. A workplace with a computer will be provided in Dübendorf.

Number of weeks offered:	16 - 52	*Working environment:*	Research and development
Within the months:	01-JUN-2024 - 31-AUG-2025	*Gross pay:*	2000 CHF / Month
Or within:	-	*Deduction to be expected:*	approx. 10 % Social security AHV/IV
Company closed within:	-	*Payment method / time of first payment:*	/
Latest possible start date:	01-SEP-2024		

Accommodation

Canteen at work:	Yes		
Expected type of accommodation:	Guest house	*Estimated cost of lodging:*	810 CHF / Month
Accommodation will be arranged by:	Employer	*Estimated cost of living incl. lodging:*	1600 CHF / Month

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Additional Information

Students with any NON-EU/EFTA nationality need for the visa and work permit an official letter from their university, confirming that the internship is compulsory (IAESTE Switzerland will apply for them).

Nomination Information

Deadline for nomination: 11-APR-2024

Date: 03-APR-2024   *On behalf of receiving country:*   IAESTE Switzerland